Middle class vulnerability to covid-19 pandemic effects and government measures in Metropolitan Lima

Vulnerabilidad de la clase media frente a los efectos de la pandemia del COVID-19 y medidas gubernamentales en Lima Metropolitana

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Using National Household Survey data, this study examines the situation of Peruvian middle class households in Metropolitan Lima and Callao prior to the COVID-19 pandemic through financial and non-financial variables in order to identify vulnerability factors in the overall population and in income quintiles. The analysis has revealed that health, income and labor are the most vulnerable indicators and could be heavily affected by government measures against COVID-19, such as mandatory social isolation (lockdown), social distancing, and movement and gathering restrictions. In this context, households in the lowest quintile are substantially more susceptible to falling into poverty due to economic instability, labor informality and lack of social protection. The study results suggest that the definition of "vulnerability" needs to go beyond poverty measurements to improve the focalization of government policies and strategies in similar crises.

Keywords: COVID-19, vulnerability, middle class, public policies

Utilizando los datos de la encuesta nacional de hogares, el estudio examina la situación previa a la pandemia causada por la COVID-19 de los hogares peruanos de clase media en Lima Metropolitana y Callao, a través de variables financieras y no financieras, para identificar factores de vulnerabilidad a nivel general y en grupos basados por quintiles del nivel de ingresos. El análisis encontró mayor vulnerabilidad en los indicadores vinculados a salud, ingresos y empleo, los cuales pueden verse gravemente afectados por las medidas del gobierno ante la COVID-19 como el aislamiento social obligatorio (cuarentena), el distanciamiento social y las restricciones en la libertad de movilización y reunión. En este contexto, los hogares del quintil más pobre se encuentran sustancialmente más vulnerables a caer en pobreza debido a la inestabilidad económica, el empleo informal y la falta de protección social. Los resultados sugieren que la definición de vulnerabilidad debe expandirse más allá de las medidas de pobreza para mejorar la focalización de las políticas y estrategias del gobierno en crisis similares.

Palabras clave: COVID-19, vulnerabilidad, clase media, políticas públicas

1. Introduction

This study aims to assess the vulnerability —analyzed from a consumer debt perspective (Cifuentes *et al.*, 2020)— of the Peruvian middle class —defined as "not rich, not poor" (Jaramillo & Zambrano, 2013)— to the COVID-19 pandemic effects and the restriction measures implemented by the Peruvian government to contain the spread of the virus, and to determine how this situation is linked to the development of public policies using data from the 2019 National Household Survey.

During the COVID-19 pandemic, the Peruvian government has adopted a number of measures to help middle and low-income households overcome the economic consequences of social distancing, lockdown and downturn. It should be noted that the Gini coefficient of Peru is 42,8 % (World Bank, 2018), which shows that there is inequality in income distribution despite the last decade's sustained economic growth.

In this scenario, Lopez-Calva and Ortiz-Juarez (2014) have identified a highly economically vulnerable group not classified as poor by the government's traditional measures and, consequently, not considered among the recipients of the financial aid granted to low-income classes. However, although they are not deemed poor, unexpected income shocks such as the COVID-19 pandemic have an impact on their income or financial capacity (Cifuentes *et al.*, 2020).

This situation, alongside the fact that 85 % of middle-class families reported to have below-average income and over 15 % considered themselves to be poor, creates a perception gap between the expectation of receiving the aid targeted for low-income households and the fact that they do not receive this aid. This also affects their consumption habits, creating a baseline of characteristics similar to those of poor households in the multidimensional poverty measurement (Koczan, 2016).

The exposure to the pandemic, the self-perceived poverty and the long-term effects of multidimensional poverty generate a vulnerability factor among middle-class households and the risk of moving towards the poverty line.

Because of this particular social mobility within the middle class —which has been a matter of analysis by several authors such as Herrera and Cozzubo (2016), Winkelried and Torres (2018), and Tavares and Betti (2020)— it is important to analyze the situation of the Peruvian middle class prior to the COVID-19 pandemic. In order to achieve this, the following methodological sequence will be followed. First, the theoretical framework will explain the "middle class" concept, its position in Latin America, the impact of the COVID-19 pandemic in the middle class and the indicators and variables to measure its vulnerability. Then, the methodological approach will be presented, as well as the operationalization of the variables. Furthermore, the results will be presented analyzing the previously determined variables. Finally, the theoretical implications discussion will be addressed as well as the conclusions.

2. Theoretical framework

Early definitions of "social class" refer to groupings based on market-related characteristics. Marx (1956) considers the assets that are brought into the economic process, highlighting

the role of private property ownership. Weber (1978 [1909]) expands the criteria to different types of profit-generating properties and services, with an emphasis on educational levels. For their part, Erikson *et al.* (1979) state that "class" is defined by employment status, sector of economy, different skills, and authority in the workplace.

Thus, the definition of middle class has often been of residual nature. Torche and López-Calva (2013) describe it as the heterogenous group located above or near poverty but lacking the necessary economic resources to achieve full protection against poverty. As mentioned by Ferreira *et al.* (2013), the availability of household data has intensified this approach, leading to more in-depth analysis of social classes through the overview of household income and consumption levels.

Operational measurements for the analysis of the middle class are often classified as follows:

1. Relative thresholds, which set up limits based on measures of central tendency from the analyzed data. These measures are often the country's median income or any other percentile based on income distribution in the country, such those shown by Easterly (2000) and Birdsall *et al.* (2000).
2. Absolute thresholds, which make use of universal limits, that are specific amounts based on standardized income measures such as Purchasing Power Parity (PPP), as presented in Milanovic and Yitzhaki (2001), Kharas (2010), and López-Calva and Ortiz-Juárez (2013).
3. Hybrid thresholds, which apply a mixed operational approach and use different sets of criteria to establish a lower and upper limit, as seen in Birdsall (2010) and Jaramillo and Zambrano (2013). It is expected to combine specific income amounts and percentiles, means or other econometric indicators such as poverty lines.

Table 1. Middle class operational measurements

Threshold model	Author	Limits taken as references to define middle class	
		Lower limit	Upper limit
Relative	Easterly (2000)	20th %	80th %
	Birdsall *et al.* (2000)	0,75x median	1,25x median
Absolute	Milanovic and Yitzhaki (2002)	USD 3 470 (annual PPP)	USD 8 000 (annual PPP)
	Kharas (2010)	USD 10 (daily PPP)	USD 100 (daily PPP)
	López-Calva and Ortiz-Juárez (2013)	USD 10 (daily PPP)	USD 50 (daily PPP)
Hybrid	Birdsall (2010)	USD 10 (daily PPP)	95th %
	Jaramillo and Zambrano (2013)	Poverty line	USD 50 (daily PPP)

Source: own elaboration.

For this analysis, Jaramillo and Zambrano's hybrid strategy will be expanded for its alignment with available national survey data, under a "not poor – not rich" approach. Middle class groupings will consider households from the country's poverty line up to (and including) the second socioeconomic strata (B), as determined by Peru's National Institute of Statistics and Informatics (INEI).

2.1. Middle class in Latin America

Over the past 15 years, Latin America's population has shown remarkable upward mobility towards the middle class, which has caused its dramatic growth, as noted in the work by Bussolo *et al.* (2014), and Duryea and Robles (2016). De la Cruz *et al.* (2020) attribute middle class increase and poverty reduction to the macroeconomic growth in the region during this period resulting from higher levels of employment and income.

Jaramillo and Zambrano (2013) describe the nature of Peru's economic growth as pro-poor, allowing millions of households to move away from poverty, and pro-middle class, with higher average income driving its expansion and consolidation. For Castilleja-Vargas and Enciso (2019), this dynamic has been supported by an increase in salaries in the service sector, informal jobs and self-employment, the surge in mineral prices and exports, and public spending in infrastructure and social investment.

However, such growth is threatened by inequality in the region. Castellani and Parent (2011) warn that the mobility potential of the poor and the resilience of the middle class remain lower than in OECD countries, while Castellani *et al.* (2014) highlight that job formality and access to quality education and health care still elude a large segment of the group. Stampini *et al.* (2015) link the problem to the strong presence of chronic (long-term) poverty among extremely and moderately poor population, especially in households with low human capital. And Castilleja-Vargas (2020) shows that middle class households in Andean countries are similar to poor households in terms of instability, informality, and risk exposure due to lack of social protection.

2.2. The COVID-19 emergency

On December 31, 2019, the World Health Organization was notified of a 27-case cluster of patients affected by an unknown respiratory syndrome in the city of Wuhan, China. By January 7, 2020, Chinese authorities had identified the new coronavirus (2019-nCov) as the possible cause, discarding other respiratory viruses.

As the virus spread worldwide, the Ministry of Health of Peru (MINSA) presented the "National Preparation and Response Plan against the Risk of Introduction of Coronavirus 2019-nCov" (Ministerial Resolution N° 039-2020/MINSA), which identified 1) a high population density, 2) the overdemand and overcrowding of hospital services, 3) a limited offer of Intensive Care Units, and 4) limited implementation of prevention and control measures as social determinants of transmission risk.

On March 11, 2020, the World Health Organization (2020) officially declared COVID-19 as a pandemic due to alarming global levels of spread, severity, and inaction.

On the same day, the Ministry of Health of Peru (MINSA) declared a national sanitary emergency for ninety (90) calendar days (Supreme Decree N° 008-2020-SA).

In the following days, the government postponed educational services, prohibited mass gatherings of more than 300 people, and fast-tracked money transfers related to social programs such as "Pensión 65" and "Contigo", which were scheduled for later dates (Supreme Decree N° 004-2020-MIDIS).

On March 15, the Peruvian executive branch declared a state of national emergency (Supreme Decree N° 044-2020-PCM), implementing mandatory social isolation (lockdown) and restriction of constitutional rights related to freedom of transit. These measures would be reinforced on March 18 with the implementation of a national nighttime curfew.

On March 16, the "Bono Quédate en casa" ["Stay at Home Grant"] grant amounting to S/ 380 was approved (Urgency Decree N° 027-2020) for households in poverty and extreme poverty, using the Household Targeting System's (SISFOH) official registry of beneficiaries.

On March 27, the "Bono Independiente" ["Grant for Independent Workers"] grant amounting to S/ 380 was approved (Urgency Decree N° 033-2020) for vulnerable households with independent workers, provided that they had not received the "Bono Quédate en casa."

On April 1, the withdrawal of S/ 2 000 from private pension accounts was approved for member contributors (Urgency Decree N° 034-2020).

During this time, transit of citizens was limited to one person per family exclusively for the provision of food and pharmaceutical supplies, except for workers of essential industries. Additional restrictions were adopted at the beginning of April, including gender-based transit rules (women/men were allowed out for only three days of the week; this measure was later withdrawn), and total lockdown for Easter holidays.

Choosing the correct policy instruments and goals is essential to solve the COVID-19 emergency. Thus, delimiting the problem into what is known as "policy problem" requires a set of logical necessary questions and intellectual work (Veselý, 2017).

Therefore, any policy design attempt has to consider that there are always key variables to be studied in order to choose viable tools and adequate focalization. For this case, it seems relevant to analyze factors related to middle class vulnerability.

2.3. Vulnerability variables and indicators

Several authors have written about the variables and sources of vulnerability during the COVID-19 pandemic; they tend to classify them as financial and non-financial, or sociodemographic. However, it is important to note that most authors include some variables to indicate overall household income, even if it is not part of the main research or approach. This is due to the fact that many authors explore longitudinal data sets and demonstrate the relation between overall income and the probability of moving below the poverty line: Dercon and Krishnan (2000), Mosley (2001), Dercon (2002), Christiaensen and Subbarao (2005), Barrientos and DeJong (2006), Sietz *et al.* (2012), Herrera and Cozzubo (2016), and Winkelried and Torres (2018).

However, most of them only explore overall income as a source of probability of social mobility. In this scenario, Cifuentes *et al.* (2020) provide a financial framework for financial vulnerability analysis from the consumer debt perspective. They propose that similar amounts of debt and income may imply different levels of financial vulnerability, since contextual reasons, such as life motives, exposure, family composition, ownership of assets and perspective of future income can classify and identify different levels of financial vulnerability. In addition, the closeness between Peruvian and Chilean economy and the geographical and cultural proximity of these countries are subject to external validity of the analysis and proposed variables.

The variables examined by Cifuentes *et al.* are all supported by previous research and their elaboration is based on the work by several authors: Betti *et al.* (2007), Herrala and Kauko (2007), Del Rio and Young (2008), Dey *et al.* (2008), Karasulu (2008), Albacete and Fessler (2010), Keese (2012), D'Alessio and Iezzi (2013), Jappelli *et al.* (2013), Martinez *et al.* (2013), Ruiz-Tagle and Vella (2016), Madeira (2018), and Cifuentes and Martínez (2019).

Financial vulnerability variables are classified into three major groups: indebtedness motives, shock and credit access, and socio-demographic variables. Indebtedness motives explore the reasons for households to apply for a credit: household article needs, vehicle purchase, vacations, medical treatment, repayment of other debts, financial activities and investment, purchase of new assets, and household renovations.

Shock and credit access refers to the possibility of receiving new credits from financial institutions based on the household's current level of indebtedness and repayment capacity. Also, unexpected negative shocks refer to past behaviors in the economic cycle generating increasing living costs and/or reduced income. This is identified by the exposure to unexpected economic shocks, loan application, loan rejection and partial loans acceptance. From the socioeconomic point of view of financial vulnerability, which refers to the household's purchase capacity, authors present total household income and total liquid assets as indicators for this variable.

On the other hand, Tavares and Betti (2020) propose that non-financial conditions are also subject to COVID-19-related vulnerability. This is also re-enforced by Cifuentes *et al.* (2020) and other authors such as Alkire *et al.* (2020), Borjas (2020) and Natale *et al.* (2020).

Among such variables are the ones related to hygiene, capacity to stay at home, capacity to comply with physical distancing at home and capacity to recover, as proposed by Tavares and Betti (2020), as well as socioeconomic factors, as proposed by Cifuentes *et al.* (2020).

Hygiene factors refer to the sanitation conditions of households. Access to public water supply and to healthcare are taken as indicators.

Stay-at-home capacity factors are inherent to the ability of family members to carry out job and education activities at home. They are related to the access to electricity and the infrastructure and materials of the location in which the family members are currently living and spending time.

Social distancing capacity factors are associated with the amount of people per room currently living in the household's living space. They are also related to the ratio of working-age and non-working-age family members.

Recovery capacity factors refer to the type of fuel used to cook in the household and if children receive free food aid such as breakfast, lunch or dinner at school or other educational institutions.

Socioeconomic variables refer to the household size, defined as the amount of people currently living in it regardless of the area or number of rooms. This approach clearly shows convergence points of recent research by Cifuentes *et al.* (2020), and Tavares and Betti (2020), as well as enough differences between concepts that are subject to analysis. The age of the household head is also taken into account in these variables.

It is important to remark that all the previous variables were subject to analysis during crises. This notwithstanding, financial factors are generic for any kind of crisis, and non-financial ones are subject to analysis in specific scenarios related to the COVID-19 pandemic.

For this research paper, both approaches will be taken into account, as the two of them help understand the various difficulties that the middle class can face during the COVID-19 pandemic crisis. It is important to understand the current situation of the middle class, considering that research variables will provide significant data for policy makers and help create more precise and targeted strategies to fight collateral damage during and after the COVID-19 crisis.

3. Methodology

Middle class is an abstract concept that needs to be carefully analyzed to accurately understand those who are supposed to belong to this group. What literature suggests is that middle class is a heterogeneous cluster with significant variations among its subgroups.

This means that what can be understood as a general vulnerability for the middle class may be not so for those members nearer upper classes. Likewise, what at first sight does not affect the middle class might be a threat for middle class groups nearer lower classes. For this reason, findings concerning the middle class are to be briefly compared with the results of its subgroups; quintiles are used precisely because they provide sufficient classification to make suitable balancing.

A quantitative non-experimental, cross-cutting, descriptive approach was chosen, as this paper aims to describe the situation of the middle class in Metropolitan Lima prior to the COVID-19 pandemic crisis. For this purpose, several indicators from the National Household Survey (ENAHO) conducted by the National Institute of Statistics and Informatics (INEI) were selected. Modules 1, 2, 3, 4, 5, 7, 34, 37 and 85 were combined and used to operationalize the variables indicated above.

To analyze the situation of the middle class, this research distinguishes three different stages. Firstly, according to literature, middle class is defined by selecting cases that do not belong to either poor or rich groups. Secondly, theoretical reviewed variables linked to vulnerability in contexts such as pandemics and other crises are analyzed to provide insight into the situation of the middle class, since they may be risk factors for this group. Finally, we discuss the findings and present suggestions regarding the relevance of public policies in this matter.

3.1. Middle class operationalization

The National Household Survey (ENAHO) is the most reliable source of information about families and their characteristics in Peru. As this paper focuses on middle class families from Lima, only data about families that belong to any of the 43 districts of Lima and Callao Region were used.

To target poor people, we used hybrid criteria as those reviewed in the literature. The lower limit is provided by INEI's poverty line criteria, which establish that families with incomes under S/ 187 per member are considered poor. The upper limit of middle class is determined by the A socioeconomic level. This variable is calculated by the INEI by applying optimal scaling, principal component analysis, clusters and regressions based on indicators such as income, education level, economic activity, properties, access to technology and spending habits.

This hybrid method to mark off middle class has been used because it responds more accurately to the Peruvian economic reality. It is important to remark that this paper aims to explore the vulnerability of the middle class and not to define the limits that establish who belong or do not belong thereto. Therefore, further analysis with econometric models could nourish these findings and offer more accurate inferences.

3.2. Variables used to analyze middle class situation

Once the middle class families from Lima were identified, we took the head of the family as the unit of analysis. Then again, literature identified certain variables to be taken into account; these are divided into financial and non-financial variables. The first group includes indicators such the family's credit system, methods of payment, income and profit and repayment capacity. The second group includes indicators such as health, house characteristics, socioeconomic features and house-related expenses. In addition, this study includes the analysis of special variables called unmet basic needs (UBM), which show five types of deprivations that families could be going through. Further incorporation of a greater number of valuable variables based on a 2021 empirical research will definitely shed light on the vulnerability phenomena.

4. Results

Middle class families represent 87.0 % of the total number (2 509 078 out of 2 883 764) of families who participated in the survey. Financial and non-financial variables were analyzed to analyze their situation and discuss which could be the vulnerability factors.

The following tables show means and quintiles for each quantitative variable so as to compare not only how the middle class performs as a big group, but which differences can be observed within. For qualitative variables, percentages were used instead of means.

4.1. Non-financial variables

Table 2. Non-financial variables: Socioeconomic variables

Socioeconomic specific variables	% / mean	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Household size (avg)	3,52	2,24	3,16	3,62	4,07	4,48
Income contributors (avg)	2,18	1,31	1,84	2,17	2,64	2,93
Head of household's gender: female (%)	34.52 %	46,57 %	38,25 %	31,65 %	30,78 %	25,32 %
Head of household's age (avg)	54,4	54,34	52,66	52,95	55,72	56,32
Head of household's occupation (%)	96,32 %	93,23 %	96,32 %	96,62 %	96,66 %	98,50 %
Incomplete high school or lower degree	28 %	39,79 %	30,33 %	25,67 %	23,89 %	18,16 %
Complete high school degree	35 %	38,49 %	43,33 %	38,09 %	35,85 %	17,62 %
Incomplete graduate degree	15 %	12,94 %	15,75 %	17,13 %	15,58 %	14,62 %
Graduate degree	18 %	8,60 %	9,53 %	17,49 %	20,95 %	35,91 %
Postgraduate degree	4 %	0,19 %	1,07 %	1,62 %	3,73 %	13,69 %

Socioeconomic variables. Each household is made up of 3,52 people on average. The mean of each quintile increases as we move up, so middle-class families with greater income have more members. The same applies to the number of contributors. Thus, the ratio of number of contributors and total members remains constant. This is relevant, as it can be said that middle-class family sizes coincide with the number of working members.

Higher quintiles mostly have men as heads of the household. This may be explained by the greater proportion of married or cohabitant heads in these groups. It might also show a kind of a conservative understanding of the concept of family. If true, this could make low quintiles whose household heads are women more vulnerable to any crisis. In any case, this inference is just speculative and would require further research.

The average age of heads of the household is 55 and does not seem to vary among quintiles. However, the occupation index is remarkably high, and it is even higher in upper quintiles. What is more, education level behaves in a particular fashion for middle class. It is observed that greater income quantiles have fewer heads of the household with incomplete high school or low education level. Heads of the household with complete higher education levels remain constant and even decrease as we approach upper quintiles, where there are more people with higher studies. Education plays a key role in promoting upward mobility and preventing downward mobility.

Table 3. Non-financial variables: Hygiene variables

Hygiene specific variables	% / mean	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Household w/ access to drinking water (%)	98,63 %	98,09 %	99,19 %	98,40 %	97,88 %	99,60 %
Household w/ daily access to drinking water (%)	96,36 %	94,37 %	95,58 %	96,38 %	97,20 %	98,22 %
Household w/o wastewater services (NBI3 %)	99,21 %	99,27 %	98,66 %	99,41 %	99,24 %	99,46 %

Hygiene. Around 95,1 % of middle-class families in Lima have access to drinking water, while 92,9 % are provided with this service on a daily basis. Besides, 99,2 % have adequate wastewater services. According to many national and international health organizations, this is a key factor for families to decrease the spread of the virus. Therefore, we can state that middle class families are not affected by drinking water issues and they have resources to tackle the issue if necessary. This does not seem to vary among quintiles.

Table 4. Non-financial variables: Stay-at-home capacity variables

Stay-at-home capacity specific variables	% / mean	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Household w/ electricity (%)	99,64 %	98,93 %	99,51 %	100,00 %	99,75 %	100,00 %
Household w/ mobile phone (%)	96,36 %	88,28 %	96,75 %	98,74 %	98,03 %	100,00 %
Household w/ internet (%)	61,62 %	25,27 %	49,66 %	63,51 %	77,98 %	91,73 %
Inadequate housing (NBI1 %)	2,44 %	4,99 %	2,79 %	2,52 %	1,69 %	0,23 %
Refrigerator	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %	100,00 %

Stay-at-home capacity. Housing services are relevant in these contexts, according to the literature reviewed. 100 % of middle-class families have refrigerators at home; 99,6 % have electricity; 96,4 % have a mobile phone, and 61,6 % have household internet services.

Even though these families stay connected through their mobiles, more than a half of them lack household internet services. Again, quintiles show some significant differences: the lowest one has 88,3 % of families with mobile phones and 25,3 % with internet connection, while the highest one has 100 % of families with mobile phones and 91,7 % with access to the internet. This represents a relevant issue, as mobiles and internet have proven to be crucial for communication and remote work.

Table 5. Non-financial variables: Social distancing capacity variables

Social distancing capacity specific variables	% / mean	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Number of rooms (avg)	3,69	2,6	3,14	3,7	4,15	4,82
Overcrowding (NBI2 - %)	2,05 %	3,16 %	2,79 %	2,25 %	1,76 %	0,30 %
High economic dependence (NBI5 - %)	0,09 %	0,34 %	0,00 %	0,00 %	0,09 %	0,00 %

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Source: own elaboration.

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Social distancing capacity. A regular middle-class house has 3.7 rooms. Middle class families do not present overcrowding problems: 97,9 % have enough space and rooms for all family members. In addition, 99,9 % of these families do not present high economic dependence. These results show, once again, that middle class families under better conditions can face the current situation more successfully. It is also noted that quintiles with greater income show a quite irrelevant number of families with unmet basic needs.

Table 6. Non-financial variables: Recovery capacity variables

Recovery capacity specific variables	% / mean	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Presence of disease (%)	61,23 %	63 %	59 %	57 %	63 %	65 %
Access to health insurance (%)	77,17 %	71,60 %	71,20 %	78,60 %	76,70 %	87,70 %
Use of cooking fuel (%)	0,45 %	1,31 %	0,36 %	0,22 %	0,13 %	0,23 %
Access to school meals (%)	4,10 %	6,21 %	5,92 %	4,47 %	2,75 %	1,16 %

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Source: own elaboration.

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Recovery capacity. Since the capacity to recover from and overcome problems associated with diseases that require quarantine as a public policy depends on the health of family members and factors linked to risk from pollution and food security, we evaluated whether family members have other diseases, whether they pay for health insurance, whether they use cooking fuel —which increases the possibility of having a damaged respiratory system— and whether the nourishing of one or more children in the family depends on school meal programs.

According to the data, 61,2 % of the heads of the household shows symptoms of a chronic disease. This percentage seems to be stable among quintiles. However, the proportion of middle class families with health insurance goes from 71,6 % in the lowest quintile to 87,7 % in the highest one. Then again, middle class families are, in general, not exposed to pollution or do not have problems with their children's food security. Around 0,45 % use fuel for cooking and 95,9 % do not receive any kind of aid to feed their children. It can be claimed that middle class families have a strong recovery capacity.

Table 7. Non-financial variables: Unmet basic needs

Number of unmet basic needs a household has	% / mean	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Household w/ 0 UBN (%)	95,16 %	91,79 %	93,80 %	95,21 %	96,19 %	98,81 %
Household w/ 1 UBN (%)	4,17 %	6,92 %	5,43 %	3,99 %	3,33 %	1,19 %
Household w/ 2 UBNs (%)	0,58 %	1,04 %	0,55 %	0,80 %	0,49 %	0,00 %
Household w/ 3 UBNs (%)	0,09 %	0,26 %	0,21 %	0,00 %	0,00 %	0,00 %
Household w/ 4 UBNs (%)	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %
Household w/ 5 UBNs (%)	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %	0,00 %

Unmet basic needs. According to the data, 95 % of the sample have no unmet basic needs, only 4 % have one UBN, 0,6 % have two UBNs, and 0,1 % have three of them. The demand of these basic needs is concentrated in the bottom quintiles.

4.2. Financial variables

Table 8. Financial variables: Income variables

Income specific variables	% / mean	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Household income from main activity (S/)	S/ 35 994	S/ 11 803	S/ 17 052	S/ 23 657	S/ 34 015	S/ 74 505
Total household income (S/)	S/ 59 801	S/ 18 236	S/ 32 067	S/ 46 052	S/ 67 618	S/ 135 078

Average gross income. The average gross income of middle class households is S/ 59 800 and the average income of the main activity is approximately S/ 36 000. Therefore, the average salary of the middle class is S/ 3 000 per month.

Table 9. Financial variables: Debt motives variables

Debt motives specific variables	% / mean	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Household w/ credit to buy or improve living place (%)	4,22 %	2,60 %	2,60 %	5,17 %	5,45 %	5,29 %
Household w/ repayment capacity (%)	23,56 %	41,05 %	18,02 %	29,78 %	21,32 %	15,05 %
Household ownership: rented (%)	15,82 %	22,37 %	17,29 %	12,56 %	13,65 %	13,22 %
Household ownership: still paying (%)	1,31 %	0,32 %	0,65 %	0,93 %	1,35 %	3,31 %

Household expenses: rent (%)	14 %	17,60 %	15,15 %	13,34 %	13,61 %	12,43 %
Household expenses: health (%)	7 %	6,38 %	6,23 %	6,55 %	7,40 %	8,73 %
Household expenses: food (%)	37 %	44,26 %	42,86 %	40,30 %	36,07 %	27,65 %
Household expenses: rent (S/.)	S/ 3 807	S/ 2 725	S/ 2 990	S/ 3 153	S/ 4 086	S/ 6 041
Household expenses: health (S/.)	S/ 2 195	S/ 919	S/ 1 325	S/ 1 673	S/ 2 286	S/ 4 484
Household expenses: food (S/.)	S/ 8 404	S/ 5 066	S/ 7 329	S/ 8 616	S/ 9 622	S/ 11 332

<div align="right">Source: own elaboration.</div>

Debt motives. Around 4,2 % of middle class families have applied for and been granted a credit to buy or improve their living place. However, almost a quarter of middle class families have struggled with credit repayment. In the first quintile, 41,1 % of families have had problems with their credit bills. In contrast, in the highest quintile, only 15,1 % did. This could raise an issue in crisis periods when people lose their jobs and still have to pay their credits.

Some middle-class families do not own their living places: they rent or are still paying for them. On average, 15,8 % rent: 22,4 % from the lowest quintile live in rented housing, while only 13,2 % from the highest one rent their place.

The expense distribution of a regular middle class family shows interesting results: 14 % of expenses are rent-related; 7 % go to health services, and 37 % belong to food provision. As we move up from the first quintile to the fifth, food and rent expenses relatively decrease compared to health expenses. This indicates that health is a luxury good consumed as income increases.

Table 10. Financial variables: Credit card access variables

Credit card access specific variables	% / mean	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Household bank account: debit card (%)	53 %	32 %	43 %	57 %	60 %	75 %
Household bank account: credit card (%)	15 %	4 %	7 %	11 %	17 %	35 %
Household food payment method: cash (%)	91 %	94 %	93 %	92 %	90 %	88 %
Household food payment method: debit card (%)	10 %	2 %	4 %	8 %	11 %	25 %
Household food payment method: credit card (%)	6 %	1 %	2 %	4 %	7 %	14 %

<div align="right">Source: own elaboration.</div>

Credit card access. Around 53 % of heads of middle class households have debit cards, while only 15 % of them have credit cards. In both cases, bank penetration percentages progressively increase as we approach the top quintiles. Regarding food payment methods, 92 % of our sample individuals use cash, and this figure decreases as

the quintile's income increases. On the other hand, the use of debit and credit cards to pay for food increases as the income of the quintile increases.

5. Discussion

The analysis provided attempts to describe the situation of the Peruvian middle class prior to the COVID-19 global pandemic and its preparedness to comply with the mitigation measures implemented (social distancing, mandatory social isolation (lockdown) and movement and gathering restrictions). This analysis also adapts to the known characteristics of the middle class —such as heterogeneity—, the availability of national public data, past middle class measurement strategies, and regional and national trends previously identified.

Household income remains the most direct or indirect indicator used to identify the middle class segment and highlight their social vulnerability to moving below the poverty line. Quintile-based analysis of household income reveals that households below the first quintile have higher dependency on main-activity income (64,7 %) than the rest of the middle class groups (with values between 50 % and 55 %). This, along with the lowest level of income contributors (1,3 %) and occupation (93,2 %), shows the instability and risk exposure of the middle class when facing labor market shocks, especially when a large part of jobs are informal, as suggested by Castilleja-Vargas and Enciso (2019), and Castilleja-Vargas (2020). It should be also noted that such households also present a significant increase in the female-led ratio (46,5 %) compared with the middle-class average (34,5 %), indicating the prevalence of single-parent families. In this scenario, it is important to remark that the dependency of single-parentship households can lead to a severe risk of orphanhood in case of parental illness.

The household's spending and consumption habits, on the other side, prove how urgent income needs are and their potential to alleviate financial urgency through spending cuts and savings. Food and rent expenses amount to 61,9 % for households below the first quintile, with a similar level (58 %) in the following group. This reduces the household's available resources for healthcare, quality education and investment on human capital, all of them mechanisms to improve resilience. Therefore, COVID-19 poses a harsh choice for low-income middle class households, as higher health expenses (whether for prevention or treatment) negatively influence their capacity to cover essential food and housing obligations.

Debt is a useful tool for households to acquire essential goods and relieve short-term financial pressure; thus, its importance grows tenfold when facing periods of crisis as the one caused by COVID-19. Nonetheless, credit-card ownership remains alarmingly low among the poorest middle-class households (3,8 % average), less than a tenth of the ownership among wealthier households (35,2 %). This points to a lower rate of access to banking services (debit card ownership also remains low), reliance on informal credit sources and overreliance on cash. Excessive reliance on cash to buy food could also indicate reliance on market visits over delivery services, thus increasing risk of exposure. The problem worsens if we consider that the poorest group has a high level of repayment issues (41 %), almost double the average for the entire middle class.

The sanitary emergency posed hygiene risks for households and, as mentioned by the World Health Organization (2019), unsafe drinking water, improper wastewater services and lack of hand-washing practices are associated with weakened immune systems and can affect COVID-19 recovery. However, strong levels in drinking water and wastewater indicators are shown across all groups in the middle class.

The implementation of mandatory social isolation (lockdown) forced household members to remain at home. As explained by Tavares *et al.* (2020), electricity plays an important role as a basic need to guarantee well-being and safe food storage. As such, high levels of electricity access in middle-class households could lower their need to buy food several times a week if they have a refrigerator at home. Inadequate housing also plays a role in compliance with lockdown but seems to pose no problem for middle-class households.

On the other hand, quarantine measures do generate a conflict for middle class households and the labor market, as the lack of access to internet services limit the household's capability to tele-work if the opportunity arises. According to Brussevich *et al.* (2020), Peru has one of the lowest scores in the tele-workability index, which measures the feasibility of working from home. With poor internet access, less than half of the households owning a computer at home, and pervasive informal working arrangements, income is at higher risk.

Social distancing is another recommended practice to avoid COVID-19 infection and, as the World Health Organization (2018) points out, crowded homes are more exposed to infectious diseases. However, middle class households display low levels of overcrowding and economic dependence, even when slightly higher levels are presented in the poorest group. This is important given that the average age of a middle class household head is 54,4 and being infected with COVID-19 could be devastating to older adults.

The recovery capacity of middle-class households is outlined by the presence of disease, which does not deviate much from 61 % across all income groups. This indicates that while risk is lowered through mitigating practices, the threat of disease does not vary in spite of monetary means. As seen before, health expense distribution grows alongside household income, and access to health insurance follows a similar trend. Among similar rates of disease prevalence, only the richest group of the middle class displays a significantly different situation regarding health investment and resources, as highlighted by Castellani *et al.* (2014). On the other hand, low levels of use of cooking fuel and access to school meals do not represent a threat to household economies during the emergency.

Finally, UBN levels remain rather low among middle class households (less than 5 % of them evidence 1 or more UBNs), which indicates that multidimensional poverty is not significant in this group and poverty-alleviating strategies are adopted using the poverty line as a starting point for focalization under normal conditions. However, the COVID-19 emergency does not represent regular conditions for middle class homes, and financial hardship similar to that observed below the poverty line might arise.

Government strategies to soften the economic blow of COVID-19 to household income targeted vulnerable households, but the definition of "vulnerability" —which included, in the first place, those in poverty and extreme poverty for "Stay at Home Grant"— eventually included non-poor households with independent workers ("Grant for Independent Workers")

and households with independent workers earning less than S/ 3 000 a month ("Universal Family Grant").

Middle class vulnerability and its acknowledgement are required to contain the effects of the COVID-19 crisis. The evidence shows that, while multidimensional basic needs are mostly covered, health, income and labor indicators are the most affected among middle-class households during the pandemic.

However, logistically speaking, granting financial aid became an issue for the government because many people have no bank account whatsoever. This unbanking situation also resulted in the overcrowding of bank agencies, which in turn promoted the spread of the COVID-19 virus. Unbanking, combined with poor tele-workability access, hinders the recovery capacity of the middle class. Therefore, even if regular literature review does not consider internet access and banking UBNs, it is important to consider these variables in a shock scenario and their introduction should be a permanent matter of analysis, as the possibility and probability of new shock scenarios is latent.

The government's first responses to the pandemic teach lessons for the upcoming months and years of public policy efforts. Health indicators show that disease prevalence is constant across middle-class households, while health and insurance expenses correlate with household income. In that context, the collapse of essential healthcare services due to COVID-related care have a cumulative impact on the poorest families. Government policies should aim at promoting universal health coverage and developing more tele-health resources while in-person health services remain closed.

As far as household income goes, the initial grants strategy exclusively aimed at poor households left the most vulnerable middle-class families without resources to cover basic needs during isolation. As Majoka and Palacios (2019) mention, targeting is meant to reduce implementation costs, but wrong targeting strategies may have caused a much greater economic impact.

The poorest and most vulnerable middle-class households were eventually provided grants, while retirement funds were made available for those in the formal job sector, but these are one-time efforts in a months-long battle. However, this short-term cash infusion was not enough, because the income-generating capacity of the middle class was not addressed by the public policy, as were not the means to reduce the contagion probability —e.g., new payment platforms, alternative banking and food supply services.

As Vasely (2020) stated, complex problems require complex solutions, and public policies set short-time objectives instead of creating capabilities to maintain the income-generating capacity of the middle class. Public policies have not tackled the real problem behind the lockdown; the COVID-19 pandemic has no deadline in sight and no return to the old normal on the horizon and will require several more short-term cash infusions if the ones above are not properly addressed.

This situation is unsustainable for the Peruvian economy in the long term, as the middle class is the driver of consumption (Kharas, 2010). Public policies need to treat this issue as a priority.

6. Conclusion

This paper examines vulnerability factors in middle-class households from Metropolitan Lima and Callao prior to the COVID-19 pandemic through financial and non-financial variables identified in past research on similar crises.

Middle class was defined as the grouping above the national poverty line ("not poor") and below socioeconomic strata A ("not rich"), using data from the 2019 National Household Survey.

Descriptive statistical analysis of both the overall population and the population divided into gross income quintiles concluded that most middle-class households were already vulnerable in terms of health, income and labor indicators when faced with national strategies such as mandatory social isolation (lockdown), social distancing and movement and gathering restrictions due to COVID-19. The effects are more evident among middle-class households in the poorest quintile, which display significantly higher vulnerability to falling into poverty.

Previous findings by Castellani *et al.* (2014), Stampini *et al.* (2015) and Castilleja-Vargas (2020) already suggested that middle class vulnerability was underlined by instability, informality and lack of social protection, especially in the case of health care and human capital investment. Future research should consider exploring the alignment and overall impact of government policies to mitigate the effects of COVID-19 over time, as well as regional and national vulnerability indicators.

In any case, the results arising from this study point to the need of expanding the definition of vulnerability beyond monetary poverty, especially in situations of crisis and shocks, understanding the heterogenous nature of middle class households. This approach could improve the focalization of public policies and strategies and strengthen resilience-related factors. Mistakes, such as having multiple ideas regarding which groups need assistance, could have been prevented by making a baseline research like this, considering variables that attempt to measure the exact situation and needs of the middle class.

Due to its inherent heterogeneity as a residual social class, it is important for further research to divide the middle class into consumption and lifestyle clusters in order to analyze the similarities and differences between groups. Likewise, it is suggested to analyze the shock vulnerability in single-parent and high-income dependency households.

This study aimed to serve as a reminder of what simple quantitative research can contribute to decision making, especially for policy makers in this kind of situation. As Howlett (2019) pointed out, public policies follow a number of steps that cannot be ignored or left incomplete, especially in the formulation and implementation stages. An adequate and timely research is fundamental to overcome crisis periods.

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