# A Multidimensional Approach to Measuring Economic Insecurity: The Case of Chile

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## Abstract

Well-being measurements are embedded in the 17 Sustainable Development Goals (SDGs) 2030 agreed by all UN member states. However, the indices included in the SDG 3, "Good health and well-being", are insufficient to measure well-being related to economic risks. This is a crucial aspect to consider knowing the vast impact the last two global crises (GFC 2007-08 and COVID-19 recession) had on the population's well-being. Considering this, I propose a strategy to measure economic insecurity in countries in the Global South. I build a 'Multidimensional Economic Insecurity Index' (MEEI) that combines four indicators of economic vulnerability that cause stress and anxiety: unexpected economic shocks, unprotected employment or non-workers in the household, over-indebtedness and asset poverty. The index offers a measure that directly relates economic uncertainty to stress and anxiety due to the lack of protection and buffers to face an unexpected economic shock. I apply the MEEI to Chile using Survey of Household Finances (SHF) cross-sectional data (2007, 2011, 2014 and 2017). The results show that i) about half of the Chilean households experienced, on average, two or more economic vulnerabilities during the last decade with an intensity of 2.3 vulnerabilities, and ii) economic insecurity affects households on the entire income distribution, even in the highest income deciles groups. By identifying the groups of households most affected by economic insecurity and its trend in recent years, applying the MEII in countries such as Chile provides relevant information to monitor, evaluate and improve social safety nets besides labour market regulations.

**Keywords:** sset poverty; economic insecurity; Global South; multidimensional index; over-indebtedness; social protection; Survey of Households Finances; well-being.

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## 1. Introduction

The Covid-19 crisis has hit most Latin American countries in the context of high levels of income inequality combined with weak social security systems that fail to offer protection to those most at risk of falling back into poverty. Despite the efforts of governments to support the most vulnerable families, a high proportion of households have experienced unemployment, descending income mobility, and sharp falls in their assets (wealth), all of which have contributed to an increase in economic insecurity (Hacker, 2019; Rohde & Tang, 2018).

The aftermath of this crisis could help to make a case for the need to redefine a new social contract based on a more robust social protection system centred on people's well-being (OECD, 2020). The design of better policies that could lead Latin American countries towards more inclusive and sustainable development will require new measures of progress and well-being (OECD, CAF, ECLAC, & EU, 2019). Measures of economic insecurity can make a significant contribution to measuring progress in the region above and beyond the Gross Domestic Product (GDP) per capita or the Human Development Index (HDI) (Barcena, Manservisi, & Pezzini, 2017).

Stiglitz, Sen, and Fitoussi (2009) highlighted the importance of measuring economic insecurity to understand how economic risks are related to individuals' well-being and designing social policies based on a broader perspective than the one obtained through static measures of poverty and material deprivation. Since then, several authors have proposed measures of economic insecurity that address the stress and anxiety produced by exposure to adverse economic events and the incapacity to face them when they occur. For reviews, see Osberg (2018) and Hacker (2018).

In upper-middle-income economies such as Chile, Brazil, Colombia and Mexico, there is little theoretical or empirical discussion on economic insecurity even though a large proportion of the population is exposed to economic shocks that not only generate income losses for the households but also lead them to experience poverty. In the Latin-American region, the social group most exposed to economic shocks has been described as the 'strugglers' (Birdsall, Lustig, & Meyer, 2014) due to the permanent effort made by this type of household to maintain their income levels. This social group faces high economic insecurity since they have neither sufficient assets to offset an economic shock nor access to unemployment insurance or compensation in case of dismissal when working in the informal sector.

The emergence of this group of households that are vulnerable to poverty in Latin America has been accompanied by a massive increase in access to credit for consumption and mortgages (Matos, 2017). However, the rapid credit growth in the region is explained as being a credit boom instead of a financial deepening (Hansen & Sulla, 2013). This economic situation increases the risk of over-indebtedness in low-income households (Guérin, Morvant-Roux, & Villarreal, 2013; Schicks, 2013). In addition, several countries in Latin America are highly vulnerable to natural disasters such as floods, droughts and earthquakes, which cause aggregate shocks to both the assets and income of households living in the affected areas.

In this paper, I propose a measure of economic insecurity at the household level that can be applied in contexts where: i) inequalities in household wealth are high, ii) the social safety net is limited, iii) indebted households are increasing due to strong credit growth, and iv) the reduction of absolute income poverty rather than relative poverty is the primary concern for policy. In particular, I study the adverse effect on households' well-being of the uncertainty of not being able to cope financially with an unexpected event that triggers an economic loss. I use the Chilean Survey of Household Finances (SHF) cross-sectional data (2007, 2011, 2014 and 2017) and build four objective indicators (unexpected economic shocks, unprotected employment or non-workers, over-indebtedness and asset poverty) for two dimensions of economic insecurity: i) household risk to an unexpected economic event, and ii) lack of household buffers to face an economic shock.

I combine these indicators using a multidimensional approach to build an adjusted multidimensional vulnerability rate called the 'Multidimensional Economic Insecurity Index' (MEII). This approach has two stages. First, I identify the economic vulnerabilities, and then, I apply an aggregation procedure to integrate the multidimensional information on economic insecurity into a single scalar measure (Alkire & Foster, 2011).

The MEII I propose has two advantages that make it an appropriate measure for policy analysis. The first advantage is that it simultaneously measures the incidence (proportion of economically insecure households) and the intensity of the economic insecurity (number of vulnerabilities affecting it). The second advantage is that the MEII can be decomposed by population subgroups (e.g. income decile groups or geographic areas) and economic insecurity domains (e.g. employment, income, indebtedness, and wealth). Thus, it allows for monitoring each of the dimensions of insecurity that are targeted by multi-sectoral policy strategies such as unemployment insurance, investment in social and affordable housing, micro-finance interventions, cash transfers, and policies to stimulate saving, among others. My proposed measure is the first to apply the concept

of economic insecurity to middle-income countries and complement other well-being measures, such as vulnerability to poverty and multidimensional poverty, which are more commonly used in these countries.

My estimates for Chile between 2007/2017 show high levels of economic insecurity in regard to both the risk of an unexpected economic event and the lack of a household buffer to offset a potential loss. More than a third of households were exposed to unexpected economic shocks during this period. The indicators providing information about households' lack of protection reveal that 62.8 per cent were asset poor, 30 per cent had only unprotected workers or non-workers, and 15.4 per cent faced over-indebtedness. When I combined the measures in the MEII, I found that, on average, about half of Chilean households experienced two or more economic vulnerabilities during the last decade, with an intensity of 2.3 vulnerabilities. The index tracks the GDP growth rate and labour informality rate, which shows its highest levels between 2007 and 2011, before registering a significant decrease between 2011 and 2014, followed by an increase between 2014 and 2017.

This paper makes two contributions. First, from a conceptual point of view, I use two dimensions of economic insecurity related to an unexpected economic event and the household buffer to protect from this potential economic loss. Although both dimensions (and their respective indicators) are sources of insecurity, each of which may trigger stress and anxiety in individuals and households, the origin of these adverse psychological effects differs. In previous work, the focus in terms of the selection of indicators has either been on choosing between subjective and objective indicators (Rohde, Tang, Osberg, & Rao, 2015; Romaguera-de-la-Cruz, 2020) or on just one source of economic insecurity (Azzopardi, Fareed, Lenain, & Sutherland, 2019; Balestra & Tonkin, 2018; Bossert & D'Ambrosio, 2013; Hacker et al., 2014; Rohde, Tang, & Rao, 2014).

Second, I propose indicators for these two dimensions of economic insecurity to be implemented in middle-income countries, especially those in Latin America, delivering a measure of well-being that contemplates the possibility of future events, which complements the forward-looking measures of vulnerability to poverty used in these countries. Until now, all measures of economic insecurity at the household or individual level have been applied using data from developed countries. I apply the MEII to Chile for the period 2007-2017. I study economic insecurity in a nation characterised by i) a significant reduction in absolute poverty coupled with a significant increase in vulnerability to poverty (Prieto, 2019); ii) an unemployment insurance system that has not yet managed to cover the workers who have greater job instability (Sehnbruch, Carranza, &

Prieto, 2018); iii) an increase in consumer debt that has been accompanied by mental health problems in households facing over-indebtedness (Hojman, Miranda, & Ruiz-Tagle, 2016); and iv) a high proportion (75 per cent) of households experiencing asset-based poverty according to the OECD measure (Balestra & Tonkin, 2018), placing Chile, in this aspect, within the most economically vulnerable OECD countries.

This paper is organised as follows. In Section 2, I summarise the most salient theoretical approaches and empirical findings related to economic insecurity. In Section 3, I describe the SHF data, and dimensions and indicators of economic insecurity used in my research. In section 4, I show the evolution of economic insecurity in Chile for each indicator. In section 5, I explain how I construct the index of economic insecurity. In Section 6, I discuss the downsides of multidimensional indexes of well-being and how to deal with them. In Section 7, I show and discuss the empirical results. In Section 8, I present the conclusions.

## 2. Background

During the last decade, new approaches have been proposed to measure the social and economic well-being of the population. These approaches go beyond gross domestic product (GDP) to measure welfare, acknowledging that production is not an appropriate indicator of individual and social well-being (Adler & Fleurbaey, 2016; D'Ambrosio, 2018; Kakwani & Silber, 2007; Stiglitz, Fitoussi, & Durand, 2018; Stiglitz et al., 2009). One of the new well-being metrics that has been studied theoretically and empirically at both levels is economic insecurity (Hacker, 2018; Osberg, 2018; Rohde & Tang, 2018). The notion of economic insecurity refers to "the adverse well-being effect of (involuntary) exposure to uncertainty in enduring an uninsured financial shortfall" (Rohde & Tang, 2018, p. 303). The idea behind it is that economic insecurity has a subjective component and is a forward-looking measure since stress and anxiety are associated with financial uncertainty. This measure assumes that changes in the subjective levels of anxiety in regard to lacking economic safety are highly correlated with changes in the objective risk (Osberg, 1998; Osberg & Sharpe, 2014).

*Economic insecurity versus vulnerability to poverty*

These characteristics distinguish economic insecurity from other welfare concepts such as income poverty, multidimensional poverty, vulnerability to poverty, and income mobility. However, economic insecurity may overlap in some respects and to varying degrees with some of the measurements mentioned above, especially with vulnerability to poverty, which is also a forward-looking measure related to the risk of income shortfall.[2] In the economic literature, vulnerability is used as a synonym of insecurity, and throughout this chapter, I use these terms interchangeably. However, there is a clear distinction between the concept of vulnerability to poverty, defined as the risk faced by a proportion of the population of falling into poverty in the near future, and economic insecurity, which refers to the risk of facing an economic shock without being financially prepared, that affects (with different degrees) the entire population .

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[2] Although both vulnerabilities to poverty and economic insecurity look forward at future hazards, the measures of vulnerability are built using backwards-looking data on individuals' past experiences (Cafiero & Vakis, 2006). Thus, any operationalization of both concepts must assume that the economic conditions where the vulnerability measures were estimated in the past remain unchanged in the present and the future.

Also, there are three specific elements of economic security that distinguish it from vulnerability to poverty (Osberg, 2010; Rohde, Tang, Osberg, & Rao, 2017). First, the fear of experiencing a significant income drop matters more for health than the fear of being poor. Second, economic insecurity measures not only include household income (like the vulnerability to poverty approach) but also the buffering role of the wealth of the household, together with information on it (e.g. unforeseen medical expenditure or debt service burden), which allows for understanding the concept of economic insecurity as a multidimensional phenomenon. Third, the economic insecurity concept incorporates a subjective dimension regarding the perception of buffers, level of indebtedness or expectations regarding future shocks, which allows for capturing the idiosyncratic characteristics of individuals.

*Economic insecurity as a measure of well-being*

The importance of economic insecurity as a measure of well-being is recognised in the Human Development Report (HDR) by the United Nations Development Program (1994), which states that economic security "requires an assured basic income for individuals, usually from productive and remunerative work, as a last resort, from a publicly funded safety net" (HDR, p. 25).[3] Beyond this formal recognition, the value of measuring economic insecurity is that provides estimates on two key welfare costs associated with it. First, economic insecurity makes difficult for households with children to plan for the future, resulting in psychological distress in the household environment and in diminished well-being, human capital investment, and development of the children in the household (Hardy, 2014; Hill, Morris, Gennetian, Wolf, & Tubbs, 2013; Western, Bloome, Sosnaud, & Tach, 2016).

Second, economic insecurity can influence complex psychological processes that cause an increase in health problems throughout people's lives (McEwen & Gianaros, 2010). Several studies have found that the physical and mental health of household members is affected by different downside risks of future economic events, such as sharp income drops or unemployment (Adda, Banks, & Von Gaudecker, 2009; Caroli & Godard, 2016; Ferrie, Shipley, Newman, Stansfeld, & Marmot, 2005; Kopasker, Montagna, & Bender, 2018; Smith, Stoddard, & Barnes, 2009).

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[3] Well-being measurements are embedded in the UN 2030 Sustainable Development Agenda that establishes 17 Goals (SDGs) agreed upon by all 193 member states (United Nations, 2019). Thus, the member states are step by step implementing SDGs into their development strategies. However, the indices included in the SDG 3, "Good health and well-being", are not sufficient to measure well-being related to economic risks. This is a crucial aspect to consider knowing the vast impact the last two global crises (global financial crisis 2007-08 and COVID-19 pandemic recession) had on the population's well-being.

Studies have shown that households that experience difficulties in raising emergency funds when facing an unexpected economic shock are associated with poor health outcomes (e.g. Rohde, Tang, Osberg, & Rao, 2016). More specifically, households lacking access to health insurance, and households financially fragile due to high indebtedness show higher prevalence of physical and mental health problems such as obesity, anxiety and depression (Clayton, Liñares-Zegarra, & Wilson, 2015; McWilliams, 2009; Münster, Rüger, Ochsmann, Letzel, & Toschke, 2009; Sweet, Kuzawa, & McDade, 2018; Sweet, Nandi, Adam, & McDade, 2013).

A direct association between economic insecurity and subjective well-being has also been found, for example, the negative relationship between job insecurity and life satisfaction in countries such as Australia, Germany and the United Kingdom (Clark & Georgellis, 2013; Green, 2011; Otterbach & Sousa-Poza, 2016), and the positive correlation between the universal coverage of health insurance in one of the states in the U.S.A. and the levels of happiness of the affected population (Kim & Koh, 2018).

There are several ways to build economic security indicators for these two dimensions. For a comprehensive review of the methods implemented recently, see Hacker et al. (2018) and Osberg (2018). However, the concept of economic insecurity has some methodological challenges in its operationalisation (Hacker, 2018; Rohde & Tang, 2018). First, it is difficult to know whether the economic shocks experienced by a household are unexpected or the result of a household decision. Second, although economic insecurity is a phenomenon that deals with unobservable and forward-looking expectations, most of the measures are based on retrospective information. Third, although several studies have shown a high correlation between both subjective and objective measurements (e.g. knowledge of future job loss (Hendren, 2017), it is reasonable to think that two individuals with similar characteristics may have very different perceptions about the future. Hence, under the same conditions, one individual can feel much more insecure than the other.

Although economic insecurity has serious implications for well-being, there is no commonly accepted framework for its analysis. This can be explained by the methodological challenges in its operationalisation. First, it is difficult to know whether the economic shocks experienced by a household are unexpected or the result of a household decision. Second, economic insecurity is a phenomenon that deals with unobservable and forward-looking expectations rather than retrospective information. Third, it is reasonable to think that two individuals with similar

characteristics may have very different perceptions about the future. Hence, under the same conditions, one individual can feel much more insecure than the other.

As a consequence, the empirical studies that have been carried out in developed countries up to now have proposed their own definitions of economic insecurity along with an ad hoc methodology for their measurement (Hacker, 2018; Osberg, 2018; Rohde & Tang, 2018). These insecurity measures, although they sometimes overlap, can be classified in three ways, according to: i) the unit of analysis (aggregate measures versus individual-level measures); ii) the nature of the dimensions (observed measures versus subjective measures); and iii) the number of dimensions considered (multidimensional measures versus unidimensional measures).

*Aggregate measures of economic insecurity*

When making comparisons across countries, the aggregated national indices allow for analysing trends in economic insecurity based on the combination of a variety of economic risk indicators. The two main macro indexes of economic insecurity are the Index of Economic Security (IES) proposed by Osberg & Sharpe (2014), and the International Labour Organization's (ILO) index of economic security (ILO, 2004). The IES comes from the 'named risks' approach, which examines four downside economic risks named in Article 25 of the UN Universal Declaration of Human Rights (i.e., unemployment, family breakup, medical costs, and poverty in old age).

Osberg & Sharpe (2014) applied an IES adjusted to 70 countries and found substantially different levels of economic insecurity across rich and developing countries. The ILO index uses aggregated data from countries to measure seven forms of labour security (income, labour market, employment, work, skills, job, and voice representation). This index is currently applied to 90 countries, covering 86 per cent of their population (Rohde & Tang, 2018). It is important to mention that these measures do not allow for measuring the subjective and idiosyncratic characteristics of insecurity. As discussed below, econometric measures based on household-level surveys allow for studying the effects and distribution of the insecurity features at the household or individual level, although this requires making assumptions on which there is still no consensus.

*Individual-level measures of economic insecurity*

Subjective measures versus observed measures

At the individual level, measures of economic insecurity can be obtained directly through subjective questions included in the surveys (e.g. general assessments of the economy, perceptions of buffers, and expectations regarding future shocks) (Espinosa, Friedman, & Yevenes, 2014; Hacker, Rehm, & Schlesinger, 2013; Manski, 2004; Rohde et al., 2015; Romaguera de la Cruz, 2017). The assumption behind these subjective measures is that people can make reasonably good forecasts of the economic risks they face. Although the economic literature has generally been sceptical about this type of premise (Bertrand & Mullainathan, 2001),[4] Hendren (2017) has shown that individuals can more or less correctly anticipate an economic shock in the near future. These findings suggest that perceived, and observed safety measures may be correlated, at least when individual responses are averaged over larger groups.

However, several authors have opted to measure economic insecurity at the individual level using objective measures also obtained from surveys.

Unidimensional measures versus multidimensional measures

Using a one-dimensional-micro-based measurement approach, economic insecurity has been conceived of as i) job insecurity (Keim, Landis, Pierce, & Earnest, 2014; Rehm, 2016b), ii) a large income loss experience or a downward deviation from trend income (Hacker et al., 2014; Hacker, Huber, Rehm, Schlesinger, & Valletta, 2010; Rohde et al., 2014; Western et al., 2016), iii) financial difficulties (over-indebtedness and arrears) (Anderloni, Bacchiocchi, & Vandone, 2012; Azzopardi et al., 2019; Białowolski, 2018), and iv) an inadequate private wealth buffer stock against shocks (Balestra & Tonkin, 2018; Bossert & D'Ambrosio, 2013).

Most of these measures of economic insecurity have focused on the United States, showing a

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[4] The main arguments of those who ask for caution against using subjective measures are: i) their sensitivity to non-observable transient influences (e.g. the state of mind of the person responding to a life satisfaction measure (Krueger & Schkade, 2008); ii) bias due to cognitive factors (e.g. subjective data may vary according to the phrasing of the questions, location in the survey and type of scale used (Tourangeau, Rips, & Rasinski, 2000)); and iii) the fact that they are not always correlated with the objective variable of interest (e.g. perception of criminal victimization and perception of corruption versus reality (Ambrey, Fleming, & Manning, 2014; Olken, 2009). However, studies that have recognised these weaknesses in their analysis have also found that specific subjective measures show a highly positive correlation with the latent variable of the phenomenon to be measured (Oswald & Wu, 2010), and that by not having perfect information about the variable of interest with objective measures, subjective measures can work better due to their ability to measure the unobservable characteristics (Jahedi & Méndez, 2014).

significant increase in recent decades, with peaks in the years 1998 and 2007. Nevertheless, integrated measures fail to include important dimensions of economic insecurity in their construction, focusing on large income loss or the buffering role of private wealth or income volatility (Osberg, 2018). For example, they fail to capture the social protection that the state can provide (e.g. eligibility for unemployment insurance benefits or severance payments) or do not incorporate subjective measures on the perception of the economic situation that reflect the anxiety and concern of individuals in a direct way (Espinosa et al., 2014).

In recent years authors have wondered whether economic insecurity is also increasing in other developed countries. Rohde et al. (2015) analysed the case of Australia using indicators of objective and subjective economic insecurity (job insecurity, financial dissatisfaction, emergency funds, unemployment risk, expenditure distress and income drop) and found that these are correlated with the country's unemployment rate and GDP growth rate. At the same time, they proposed a measure of economic insecurity using a multidimensional index that combined all of the unidimensional measures into a single indicator using the principal components method. The rationale behind this multidimensional measure is that an appropriate concept of economic insecurity should be able to capture all types of economic stress explained by the risk of a negative financial future. In this way, economic insecurity can be conceptualised as a latent variable that can be inferred by the exposure to specific types of potential economic hazard (Rohde, Tang, & Osberg, 2017, p. 1669).

The proposal of a multidimensional index to measure economic insecurity is not new. Bucks (2011) measured economic insecurity in the United States using twelve household-level measures of i) vulnerability to health, employment, or income shocks, ii) adequacy of household savings and income, and iii) borrowing constraints. His index is based on the methodology proposed by Alkire & Foster (2011) for measuring multidimensional poverty. Unlike Hacker et al. (2014), Bucks (2011) did not find a significant increase in economic insecurity except during the Great Recession (2007-2009).

A third country where economic insecurity has been measured from a multidimensional perspective is Spain. Romaguera de la Cruz (2017) constructed an index from a modified version of the objective and subjective indicators used by Rohde et al. (2015) and an adjusted version of Alkire & Foster's methodology (2011). The estimates show that after the Great Recession, economic insecurity in Spain fell (in the year 2011), but since then the economic insecurity has

been continually increasing. However, multidimensional measures that capture the insecurity of a household or individual in a single statistic have an important disadvantage. They are less clear and more sensitive to the choice of dimensions and weights in the construction of the index than an integrated measure (Hacker, 2018).

*Economic insecurity measures in the Global South*

Although Osberg & Sharpe's IES proposed a multidimensional measure at the aggregate level to compare both Global North and Global South countries, indices of economic insecurity at the individual or household level allow for comparative analysis between different groups within each country, making them a key tool for the design of social protection policies that can offer a better safety net to protect households from the stress or anxiety caused by not being economically prepared to face different economic shocks in the future.

It is worth mentioning that economic insecurity measures at individual-level have not been developed in the Global South. In these countries vulnerability to poverty is the concept that is most often examined. It has helped in thinking about how to protect people from the risk of a decline in their well-being (López-Calva & Ortiz-Juarez, 2014). Specifically, in Latin America, vulnerability to poverty is the concept that has been used to study the income dynamics of households with a focus on income drops (Ferreira et al., 2013; Stampini, Robles, Sáenz, Ibarrarán, & Medellín, 2016).

In Global South countries, vulnerability to poverty and economic insecurity are forward-looking concepts that overlap in their goal of informing the design of policies focused on preventing households facing unexpected income falls. The complementarity between these two measures makes them applicable to nations beyond the developed world, that is, countries characterised by a large reduction in absolute poverty is accompanied by an increase in the number of households that have a high risk of falling into poverty again, weak social protection systems, an expansion in access to credit (depicted as a boom) and high exposure to aggregate shocks.

## 3. Data and measures of economic insecurity

*SHF data*

I use data from the Chilean Survey of Household Finances (SHF) carried out by the Central Bank of Chile in 2007, 2011, 2014 and 2017. The SHF is representative of urban private households. It collected information on income, expenditure, household characteristics, household assets and debts with a high degree of detail.[5] The SHF used a stratified, multi-stage probability sample selected from the population Census (2002 and 2012) sampling frame and included an oversample of well-off households using taxpayer information from the Chilean Internal Revenue Service (SII for its acronym in Spanish). The SHF design is similar to that of the U.S.A. Survey of Consumer Finances (Kennickell & Woodburn, 1999), as well as of the Household Finance and Consumption Survey coordinated by the European Central Bank (HFCN, 2016).[6]

I use the SHF household-level data, which not only contains variables on financial and non-financial assets and debts, but also include socioeconomic and demographic variables. The size of the sample in 2007 was 3,827 households. The 2011 sample comprised 4,057 households and the samples in 2014 and 2017 comprised 4,502 and 4,449 households respectively.

In summary, the economic insecurity variables obtained from the SHF are i) employment status and type of contract of household members; ii) retrospective questions related to significant unexpected expenses or substantial unexpected income drops faced by the households in the last two years; iii) information on the burden that debt imposes on the income of household; and iv) household assets such as non-housing wealth.

I use the Chilean national poverty line defined by the Ministry of Social Development (2015), which measures poverty in absolute terms. This threshold is based on the cost of a basic food bundle. I construct post-transfer household income as the sum of income from labour, imputed rent, and private transfers plus public transfers. Because I use assets as a stock of material resources that can support the current consumption of a household, it is appropriate to equivalise it in the same way

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[5] The SHF methodological documents, reports and databases can be accessed through the following link: https://www.bcentral.cl/financiera-de-hogares

[6] These characteristics have made it possible to include the Chilean SHF in the OECD Wealth Distribution Database, which has been used for comparative studies on households' wealth inequality (Balestra & Tonkin, 2018; Murtin & d'Ercole, 2015; OECD, 2013).

as household income is equivalised (OECD, 2013, p. 141). Therefore, to account for different disposable income and asset requirements for different family sizes, I equivalise both income and assets using the scale that is equivalent to the household size to the power of 0.7.[7]

I break down my estimates of the Multidimensional Economic Insecurity Index by individual characteristics such as gender, age and education level and household characteristics such as family type (couple or single, with or without children, or lone person), size of the household, housing (outright owner or owner with mortgage or tenant) and location (regions).

*Measures of economic insecurity*

To measure economic insecurity requires quantifying the level of stress or anxiety of a household attributed to an uncertain financial future. Given that stress or anxiety is not directly observable in the data sources that sociologists and economists usually work with, sources of economic insecurity rely on proxies. I classify these proxy measures into two dimensions. The first dimension is the risk of the household experiencing potential events related to negative economic consequences such as unemployment, losses in asset values, or unexpected medical expenses. The second dimension is the lack of household economic buffers, which generates stress such as not having enough assets to face an event that decreases incomes or increases expenses, or not having access to social protection mechanisms to offset these economic losses.

Following an approach focused on the household-level measures, due to the existence of a shared decision-making process, my work uses four sources of stress distributed across two dimensions of the economic insecurity. As mentioned above, the first dimension is vulnerability to economic loss. I consider in this dimension a measure of unexpected large income loss or unanticipated expenses (known as downside income insecurity). The lack of household buffers is the second dimension. It includes three measures: i) unprotected employment or non-workers in the household, ii) over-indebtedness, and iii) asset poverty.

My starting point in the selection of these indicators is that the level of stress or anxiety of an individual or household depends on the combination of these four sources of economic insecurity.

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[7] The use of equivalence scales for the estimation of household income in Chile began in 2013. The value of the equivalence elasticity was defined by an Expert Advisory Committee to update the poverty line (Ministerio Desarrollo Social, 2015).

For example, a family facing a decrease in their income (e.g., losing their job without access to unemployment insurance) might spend their savings or borrow money. However, families that have low levels of savings, or that have a limited ability to borrow, or are already allocating a large portion of their income to servicing a debt, may have trouble addressing this unexpected drop in earnings and be forced to give up food or fail to pay their debts or other receipts.

Sometimes these situations overlap or combine with aggregated shocks like economic crises or natural disasters, which cause households to face an enormous wealth loss. An example is Latin America, where a large proportion of the population live in informal settlements located on residual land (e.g. ravines and river shores) making them particularly vulnerable to the frequent occurrence of natural disasters (earthquakes and floods). This reality has a negative impact on the value of the real assets of households (e.g. dwellings or vehicles) affecting the long-term economic security of these families (Baez, Fuchs, & Rodriguez-Castelan, 2017). These situations are associated with an increase in the level of stress or anxiety of the head of household and other members.

In the following section, I justify the selection of the four sources of economic insecurity. For that, I rely on the empirical evidence offered by the health economics literature. Several investigations have linked these economic vulnerabilities with health problems, in particular with the stress of the home and its members. I describe the operationalisation of the indicators for each source of economic insecurity based on the information provided by the SHF.

<u>Household risk to an unexpected economic event</u>

Income insecurity refers to the risk of large income drops or unexpected expenses faced by families should they encounter unpredictable events of social life (Western, Bloome, Sosnaud, & Tach, 2012). In addition to unemployment risk, the common triggers of income insecurity are family breakdown and illness. Concerning health problems, these not only cause losses in household income (e.g. independent or informal workers with no protection for this type of incidents) but also unanticipated costs whereby part of the household income has to be used for medical expenses (Adda et al., 2009). Studies have shown that household experiences of income instability are associated with situations of stress in parents and children, and increase the likelihood of indebtedness of the household, inconsistency in consumption, and underinvestment in children (Hill et al., 2013; Western et al., 2016; Yeung, Linver, & Brooks–Gunn, 2002).

The indicator I propose to measure income insecurity is based on the following SHF retrospective question: "Have you faced either unexpected expenses of significant magnitude or an income drop of significant magnitude during the last year?".[8] Although it is not an objective measure such as a household disposable income fall, it does ensure that the economic shock is considered as unexpected and not a household decision. I change this dichotomous indicator for a measure of risk attached to each household making out-of-sample predictions. I use a probit model, in which the dependant variable takes the value 1 if the household faced any economic event that triggered a sharp drop in income or a sharp increase in their expenses in $t-1$, and 0 otherwise. Both household head characteristics and household characteristics at $t$, are used as covariables, including gender, age, labour status, educational level, type of households, number of children, number of workers, housing and household income. See the model on Table A.1, in the appendices.

Assuming the relation stays the same for the next period, I attached to each household the predicted probability calculated using the characteristics at the current period and coefficients from the regression of that year. I classify a household as income insecure if the risk of an unexpected economic event is situated above a threshold. I establish the 70th percentile of predicted probabilities as a threshold because it is the cut-off that is closest to the observed values after doing sensitivity analyses for different thresholds. In this way, I differ from authors who have measured a similar economic insecurity dimension (a drop in household income) in their multidimensional index following the proposal of Hacker et al. (2010). Bucks (2011), Rohde et al.(2015) and Romaguera de la Cruz (2017) operationalise the income insecure dimension as a binary indicator of whether households experienced a large income drop in the last year, not the risk of facing it. By doing this, in addition to having an ex-post measure instead of a looking-forward measure, they cannot classify as vulnerable households that have not experienced such an economic shock in the previous year.

As mentioned above, both job loss and serious illness are among the major event of unexpected economic shock. There is an extensive literature that measures when out-of-pocket exceed a cut-off such as 10 or 25 per cent of household income for consumption–known as a catastrophic expenditure (e.g. Thomson, Cylus, & Evetovits, 2019; Wagstaff, Eozenou, & Smitz, 2020). Studies have shown an association between health outcomes and households that do not know how to pay a medical bill in case of severe disease (e.g. because they do not have health insurance) (Adda et al.,

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[8] In 2007 the SHF did not include this question. Therefore, I used as a proxy the SHF 2007 question if household had expenses larger than its income in the last year.

2009; McWilliams, 2009).

For job insecurity, studies are even more abundant. It was first defined by Greenhalgh & Rosenblatt (1984, p. 484) as the "perceived powerlessness to maintain desired continuity in a threatened job situation". Since then, a series of studies have analysed the levels of anxiety (Cheng & Chan, 2008; Huang, Lee, Ashford, Chen, & Ren, 2010; Keim et al., 2014) and health physical and mental problems generated by workers' concerns about losing their jobs (Caroli & Godard, 2016; Green, 2011; László et al., 2010; Muenster, Rueger, Ochsmann, Letzel, & Toschke, 2011; Watson & Osberg, 2018).[9]

I do not include both out-of-pocket health spending dimension and job insecurity dimension in my framework because the SHF data does not allow me to do so. Regarding the former dimension, the SHF does not collect information on household consumption. Therefore, I cannot calculate any measure of catastrophic out-of-pocket expenses. Regarding the latter dimension, the SHF asks for the interviewee's perception about the future stability of his / her current job. However, these questions are not comparable between 2011 and 2014 and were not included in 2007. Although the SHF has a panel sub-sample that could allow estimating the risk of losing a job at the individual level, there is a significant proportion of individuals who were not interviewed in the next round. The follow-up rules of the panel focused on contacting households, not households' members. Therefore, individuals who left their original household were not followed.

Lack of buffers to offset potential economic loss

a) Unprotected employment or non-workers in the household

Although I do not include an indicator that would account for the risk that a household has of an economic shock due to a job loss, I do consider the current employment situation of the household members in regard to facing an event of this type in the future. The term informal employment is used to refer to a lack of economic protection in the case of dismissal or a work accident. Salaried workers that do not have health and social security contributions as part of their labour relationship with their employer have an informal occupation. Self-employed workers and employees who are part of the informal sector (that is, their businesses are not registered in the Internal Revenue

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[9] See Lee et al. (2018) for a complete review of the research on job insecurity.

Service) are informal workers (ILO, 2013).

The SHF collects information on the occupational category and the type of contract of all the members of the household that are working at the time the survey is applied. Also, it asks whether or not household members pay social security contributions. This information allows me to construct a variable that distinguishes an informal worker from a formal one. I start from the assumption that formal jobs normally offer economic protection in the case of dismissal.

For households without any labour market attachment, I consider that they are also unprotected against an unexpected economic shock. This consideration is important because these types of households could be classified as economically secure as they do not have informal workers. Thus, the objective indicator of economic insecurity for each household works as follows: I classify a household as economically insecure if i) none of the workers in the household has access to unemployment insurance benefits or would receive any sort of compensation in the event of their dismissal, or ii) the household does not have members working. This indicator takes the value of 1 when all workers are informal workers or there are non-workers in the household.

b) Over-indebtedness

Several researchers have shown that over-indebtedness can lead to financial difficulties (e.g., unsuitable debt or debt arrears) that cause a series of adverse psychological effects (such as distress, anxiety, reduction of life satisfaction and depression) in the members of the household, mainly the head of household (Białowolski, 2018; Białowolski & Weziak-Bialowolska, 2014; Bridges & Disney, 2010; Brown, Taylor, & Wheatley Price, 2005; Hojman et al., 2016; Selenko & Batinic, 2011; Sweet et al., 2013). Although it is not possible to know exactly whether the over-indebtedness was due to an unexpected event, or a risky planned decision, a household with a high default risk experiences a stressful situation because it is highly sensitive to any future economic loss, even if this is not a significant loss.

In the SFH, various questions address the level of indebtedness and debt problems that the households interviewed have experienced. The indicator of vulnerability that I use measures the debt service to income ratio. It provides information on the burden that the debt imposes on the household's current income, and it is estimated as the ratio of the monthly payment of the debt to the disposable income of the household. Although in the SHF the interviewee is asked about

his/her perception of the level of household indebtedness, I use only the information observed about this source of economic insecurity. In this way, I avoid introducing potential subjective bias related to the idiosyncratic characteristics of individuals in the construction of the indicator.

c) Asset poverty

A household that does not have an adequate buffer (wealth) against major economic shocks is aware of its economic vulnerability generating stress and anxiety among its members (Bossert & D'Ambrosio, 2013). The economic literature focused on the lower part of the income distribution has measured this economic disadvantage as asset poverty (Brandolini, Magri, & Smeeding, 2010). A household is considered to experience asset poverty if its assets (e.g. net worth, non-housing wealth or liquid assets) are insufficient to keep it above the poverty line for a specific period of time (e.g. 3 or 6 months) (Haveman & Wolff, 2004).[10] I use non-housing wealth as household assets, which refers to the difference between total assets and total liabilities, without considering any wealth or debt related to the primary residence. I consider three months as the least amount of time that a household should be able to stay out of poverty if it liquidates all of its non-housing wealth.

Table 1: Dimensions, indicators and cut-offs of the economic insecurity sources

| Dimensions | Indicators | Household is vulnerable if… |
|---|---|---|
| Household risk to an unexpected economic event | Unexpected economic shocks | the risk of experiencing an unexpected decrease in incomes or an unexpected increase in expenses in the next year is greater than the 70th percentile risk of all households |
| Lack of buffers to offset potential economic loss | Unprotected employment or non-workers | its workers have not a labour contract and none pay social contributions, or it does not have workers |
|  | Over-indebtedness | the ratio of the monthly payment of the debt to the disposable income of the household is 40 % or more |
|  | Asset poverty | assets are insufficient to keep it above the poverty line for three months |

Note: All variables are dichotomous.

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[10] The OECD has used this definition of asset poverty to compare the levels of economic vulnerability of member countries (Balestra & Tonkin, 2018). Economically vulnerable households are those that are not income poor but asset poor. The wealth concept used is liquid financial wealth (e.g., bank accounts and other financial assets) because it can be easily monetised, and the period of time is 3 months. The income poor are those with an equivalised income below 50 percent of the median income (OECD, 2017, p. 89).

Although several works use liquid assets in the asset-poverty operationalisation (Balestra & Tonkin, 2018; Hacker et al., 2014) I decided not to use this for Chile for two reasons. First, when applying the liquid assets measure to Chile, 9 out of 10 households fall into asset-poverty in the 10-year period analysed (2007/2017). Hence, this definition provides little information for middle-high income country contexts like Chile. Second, including real assets such as vehicles in the operationalisation of asset-poverty allows for considering selling the vehicle to be a concrete and feasible strategy for the household to address an income shock in this type of national context.

In total, I generate four measures of economic insecurity at the household level. For the dimension on the household risk to an unexpected economic event, I use one indicator and for the dimension on the lack of household economic buffers, I use three indicators (Table 1). This allows me to have a set of indicators that captures vulnerability in different ways. While none of the indicators perfectly captures all aspects of each economic insecurity dimension, taken together, they can be used to identify most of the major sources of stress or risk.

## 4. Economic insecurity in Chile: an overview

In this section, I provide a descriptive analysis of the four indicators of economic insecurity to contextualise economic insecurity in Chile between 2007 and 2017. Table 2 shows the behaviour of the insecurity measures constructed with the SHF data. In aggregate, the indicators deliver a broad and clear definition of economic insecurity. When combining all of the years, 8 out of 10 households are classified as economically insecure in at least one of the four measures during the decade studied. Half of the population is classified as economically insecure when considering two or more vulnerabilities. When using a more demanding criterion, that is, three or more vulnerabilities, 13.9 per cent are economically insecure, and only 1.6 per cent of households are in a situation of insecurity in the four indicators.

Table 2: Shares of households classified as economically insecure in Chile, 2007-2017

| Dimensions and indicators | Headcount ratio: 2007-2017 | SHF cross-section survey year | | | | Time trend: 2007-2017 |
|---|---|---|---|---|---|---|
| | | 2007 | 2011 | 2014 | 2017 | |
| *Household risk to an unexpected economic event* | | | | | | |
| Unexpected economic shocks | 37.9 | 43.7 | 37.9 | 31.5 | 38.5 | -5.3** |
| *Lack of buffers to offset potential economic loss* | | | | | | |
| Unprotected employment or non-workers | 30.0 | 34.0 | 37.6 | 23.8 | 24.5 | -9.5** |
| Over-indebtedness | 15.4 | 15.1 | 13.5 | 15.2 | 17.6 | 2.6* |
| Asset poverty | 62.8 | 67.2 | 72.7 | 56.2 | 55.1 | -12.1** |
| *Households by number of vulnerabilities* | | | | | | |
| One (any) vulnerability | 81.0 | 84.6 | 86.8 | 75.1 | 77.7 | -6.9** |
| Two or more | 49.5 | 55.4 | 56.9 | 40.6 | 45.1 | -10.3** |
| Three or more | 13.9 | 18.0 | 16.0 | 9.9 | 11.6 | -6.4** |
| Four | 1.6 | 1.9 | 2.1 | 1.1 | 1.3 | -0.6* |
| Number of households | | 3,827 | 4,057 | 4,502 | 4,549 | |

Source: Author's calculations based on the Chilean Survey of Household Finances (2007, 2011, 2014 and 2017).

The estimated trends are shown in the last column of Table 2. The indicator that measures the risk of households facing an economic shock presents a significant negative tendency during the period analysed, despite the increase from 31.5 per cent to 38.5 per cent between 2014 and 2017. This indicator appears coupled with the changes in national unemployment and GDP growth rates.

Figure 1 shows that after the economic crisis in 2008, the annual unemployment rate rose to 11.3 per cent in 2009, and then began to decline during the economic expansion period, reaching 6.2 per cent in 2013. Since then the rate of unemployment has slightly increased. Likewise, the economic growth recovered by 2010, reaching similar rates to that before the financial crisis; it then fluctuated at around 5.5 per cent per year until 2013, after which time there was a substantial decline (about 1.7 per cent annually).

Figure 1: Evolution of economic growth and unemployment in Chile, 2007-2017
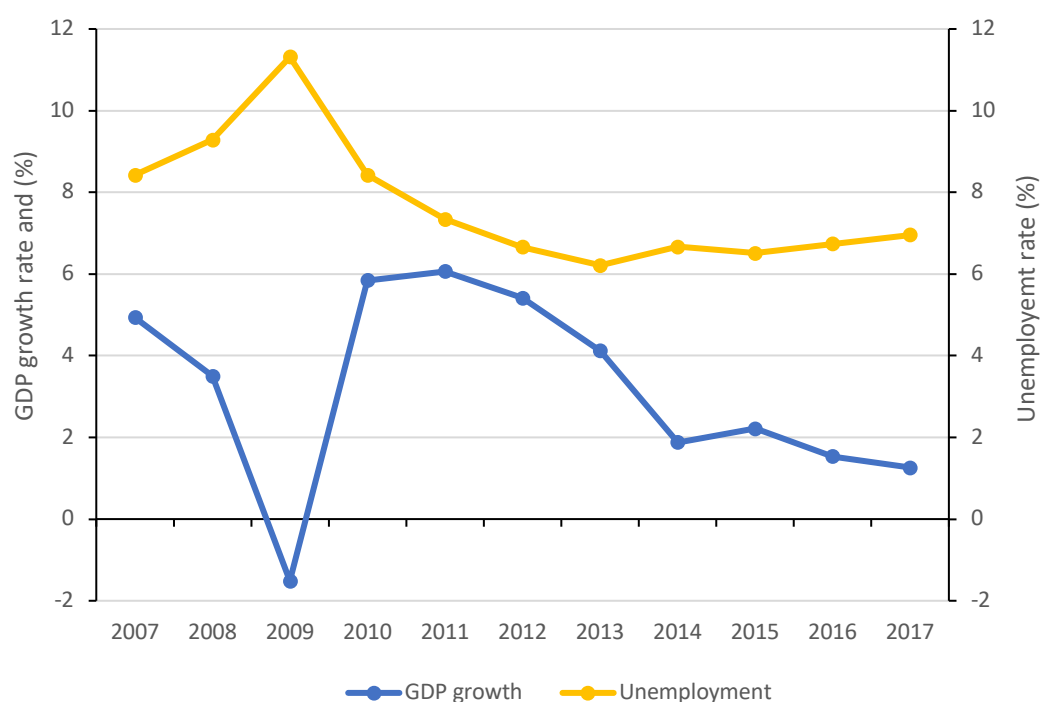


Sources: For GDP growth, data from OECD Economic Outlook 102 database, and for unemployment data from International Labour Organization, ILOSTAT database.

Concerning the lack of protection of households to offset an economic loss, significant improvements are observed. The proportion of households with workers without access to social protection mechanisms or non-workers decreased from 34.0 per cent in 2017 to 24.5 per cent in 2007. Likewise, the proportion of households without enough private assets to face an event with negative economic consequences fell from 67.2 per cent in 2017 to 55.1 per cent in 2007. The highest levels of economic insecurity were reached in 2011 when 37.6 per cent of households were either in unprotected jobs or had non-worker members, and 72.7 per cent of households were asset poor. Only the over-indebtedness of households significantly increased during the period studied. In 2017, 17.6 per cent of households showed a high risk of default.

The tendencies of these three measures of household buffers to offset an unexpected economic loss can be somewhat contrasted with macro indicators. For instance, the asset poor households follow the macro changes in the economy and labour market (Figure 1). In the case of households with unprotected employment, it is not evident that this is related to a decrease in unemployment. This can be associated with either an increase in informal jobs or with an increase in the rate of labour-protected jobs. Figure 2 clarifies this point. Between 2010 and 2013, the proportion of informal work fell from 39.2 per cent to 34.9 per cent in the Chilean labour market. However, in the following years, the informality rate increased slightly, reaching 35.8 per cent in 2017. As to the level of households' over-indebtedness, this indicator follows the trend of financial resources allocated by domestic money banks. Figure 2 shows that between 2010 and 2017, the bank private credit rate increased by 13.2 per cent, peaking at 80.6 per cent in 2015.

Figure 2: Evolution of bank credit to GDP and labour informality in Chile over time
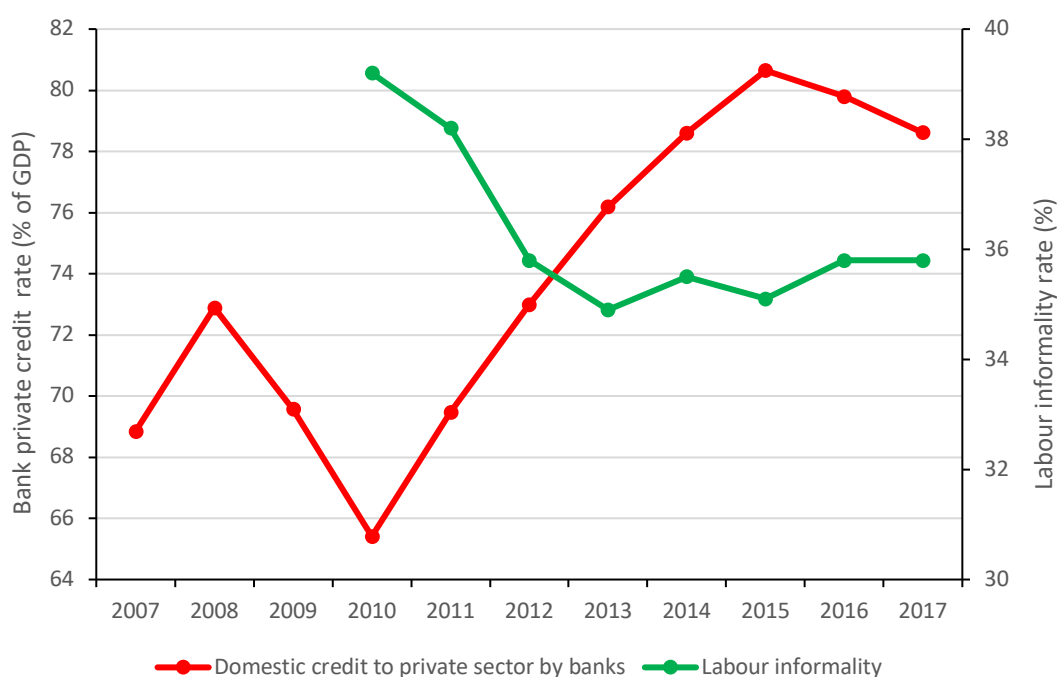


Sources: For labour informality data from New National Employment Survey (known as NENE in Spanish which began to be applied on 2010), and for domestic credit to private sector by banks, data from World Bank, databank.

Table 3 shows the association between economic insecurity measures. A third of households with unprotected workers or non-workers are at risk of facing an unexpected economic shock. In the case of the over-indebtedness indicator, 46 per cent of households have a high probability of experiencing an event that generates an economic loss. As to the asset poverty indicator, 44.5 per cent of households in this situation are at risk of having a significant income drop or higher

expenses in the near future. It is worth noting that none of the correlation coefficients between the indicators is greater than 0.3 (see Table A.2 in the appendix). This minimises the problem of double counting, which, as I will discuss in the next section, is one of the critiques to multidimensional approaches.

Table 3: The joint distribution between economic insecurity indicators in Chile, 2007-2017

| Indicators | Per cent of households in row meeting column criterion (%) | | | |
| --- | --- | --- | --- | --- |
| | Unexpected economic shocks | Uninsured employment | Over-indebtedness | Asset poverty |
| All households | 37.9 | 30.0 | 15.4 | 62.8 |
| Unexpected economic shocks | - | 25.9 | 18.6 | 73.5 |
| Unprotected employment or non-workers | 32.9 | - | 15.1 | 70.2 |
| Over-indebtedness | 46.0 | 29.5 | - | 72.7 |
| Asset poverty | 44.5 | 33.5 | 17.9 | - |

Source: Author's calculations based on the Chilean Survey of Household Finances (2007, 2011, 2014 and 2017).

## 5. A multidimensional measure of economic insecurity

Although the sum of the vulnerabilities presented in Table 2 reveals, with a single measure, the proportion of households that are in a situation of economic insecurity, the index of economic insecurity is not sensitive to changes in the vulnerabilities of the households that are above or below the threshold used. In formal terms, this type of index does not satisfy the properties of dimensional monotonicity. For example, if one were to consider a household economically insecure when it shows two vulnerabilities, the headcount ratio of economically insecure households would not change if a household experiencing three types of vulnerabilities increased to four.

*Using the adjusted headcount ratio to measure multidimensional economic insecurity*

There are several approaches that have been developed to aggregate and summarise information on multidimensional phenomena such as poverty and inequality (Aaberge & Brandolini, 2015). One of the best known is Alkire & Foster's Multidimensional Poverty Index (MPI) (2011) based on the counting approach (Atkinson, 2003). Alkire & Foster (2011) propose an adjusted headcount ratio as a MPI that is sensitive to changes in the dimensions of the phenomenon that households

are facing over time. My empirical strategy is to adapt their approach to the construction of a multidimensional index of economic insecurity.

It is worth mentioning that Alkire & Foster (2011) MPI has been calculated in 104 countries to identify multiple deprivations at the household level (Alkire & Santos, 2014), and their adjusted headcount ratio has been used in other multidimensional concepts such as job quality. For instance, García-Pérez et al. (2017) for Spain and Sehnbruch et al. (2020) for nine Latin American countries. Economic insecurity also has been measured from a multidimensional perspective following Alkire & Foster (2011) approach in north-western countries. The first time was in the U.S. using cross-sections and panel data from the Survey of Consumer Finances between 1989 and 2009 (Bucks, 2011), and recently in 28 EU countries, using longitudinal EU-SILC data from 2009 to 2016 (Cantó, García-Pérez, & Romaguera de la Cruz, 2019).[11]

The approach that I follow has three parts: i) the identification of households that are economically insecure, ii) the aggregation of the different indicators into a scalar value, and iii) the selection of dimensional weights for each indicator.

<u>Identifying economically insecure households</u>

As I described above, I have selected the two dimensions and their indicators which, in my framework are related to household risk to an unexpected economic event and lack of buffers to offset a potential economic loss. Also, I identified economic insecurity for each of the indicators using specific thresholds (see Table 1). The next step is to determine if a household has enough vulnerabilities to be considered economically insecure.

To do this, I build the variable *EI*, which summarizes the total number of economic vulnerability indicators. It is a weighted sum of vulnerabilities in the indicators that define economic insecurity. For a household *i* it is calculated as follows:

$$EI_i = \sum_{j=1}^{V} w_j I_{ij} \quad i = 1, \dots, n \tag{1}$$

where $I_{ij}$ is a variable that takes the value 1 if the household *i* is vulnerable in the indicator *j* and 0

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[11] Cantó el al. (2019) research is based on the Romaguera de la Cruz (2017) work who built an economic insecurity index using an adaptation of Alkire & Foster's (2011) model proposed by García-Pérez et al. (2017).

otherwise, $V$ is the total number of vulnerabilities analysed, $w_j$ is the wight assigned to each indicator and $n$ is the total of number of households. The weights are standardised so that their sum equals the total number of indicators, $V$. Therefore, $EI_i$ will take values between 0 and $V$, where 0 is associated to a household that is not considered to be economic insecurity in any indicators and $V$ is associated to a household $i$ that is considered to be economic vulnerable in all of them.

Once I calculated the $EI$ value for each household, I identify a household as economically insecure from a multidimensional perspective if $EI$ is greater than or equal to the cut-off $k$ ($EI_i \geq k$). And then, the sum of the economically insecure households of $n$ households of the total population is given by $q_{EI}$ ($q_{EI} = \sum_{i=1}^{n} I_{\{EI_i \geq k\}}$).

Aggregate economic insecurity measures

From an aggregate perspective, I can summarize the information on the economic insecurity of households by one scalar known as 'adjusted multidimensional headcount ratio' ($M_0$).[12] As mentioned the $M_0$ increases/decreases when the number of economic vulnerabilities increases/decreases, therefore it satisfies the properties of dimensional monotonicity (Alkire & Foster, 2011, p. 481). The $M_0$ calculates the total weighted sum of economic vulnerabilities divided by the maximum number of vulnerabilities that all households ($nV$) could have experienced. Formally, this expression is:

$$M_0 = \frac{\sum_{i=1}^{n} EI_i I_{\{EI_i \geq k\}}}{nV} \tag{2}$$

From the perspective of policy analysis the Alkire & Foster (2011) adjusted headcount ratio has two characteristics that make it an appropriate measure. First, it simultaneously measures both the incidence (proportion of economically insecure households) and the intensity of the economic insecurity (number of vulnerabilities affecting it). Second, it can be decomposed by population subgroup (e.g. income decile groups or geographic area) and economic insecurity indicators (e.g. unexpected economic shocks, unprotected employment, over-indebtedness, and asset poverty).

Regarding the former, I can calculate the ($M_0$) using the product of both the incidence ($H$) and the

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[12] Alkire and Foster (2011) also propose measures of intensity ($M_1$) and inequality ($M_2$) that are not used in my proposal because my indicators of economic insecurity are dichotomous, and cardinal data is required for their calculation.

intensity ($A$) of the economic insecurity phenomenon.

$$M_0 = HxA \tag{3}$$

To measure the incidence of economic insecurity in the population, I calculate the 'multidimensional headcount ratio' as follow:[13]

$$H = \frac{q_{EI}}{n} \tag{4}$$

Then I measure the intensity of economic insecurity as the average of the vulnerabilities faced by economic insecure households standardised ($u_{EI}^{q_{EI}} = \sum_{i=1}^{n} EI_i I_{\{EI_i \geq k\}}/q_{EI}$) by the total number of indicators of economic vulnerability $V$.

$$A = \frac{u_{EI}^{q_{EI}}}{V} \tag{5}$$

Replacing $H$ and $A$ in Eq. 3, I get Eq. 2 since $q_{EI} u_{EI}^{q_{EI}} = \sum_{i=1}^{n} I_{\{EI_i \geq k\}}$

$$M_0 = \frac{q_{EI}}{n} \frac{u_{EI}^{q_{EI}}}{V} \tag{6}$$

Regarding the latter, the $M_0$ is additively decomposable by population subgroup, and also by vulnerabilities (Alkire & Foster, 2011). Therefore, the $M_0$ can be expressed as a weighted sum of the adjusted headcount ratios of each of the $S$ subgroups:

$$M_0 = \sum_{l=1}^{S} \frac{n_l}{n} M_{0_l}$$

where $n_l$ is the size and $M_{0_l}$ is the the adjusted headcount ratio of subpopulation $l$.

The $M_0$ can also be decomposed by vulnerabilities as follows:

$$M_0 = \sum_{j=1}^{V} \frac{H_j}{V}$$

where $H_j$ is the proportion of the total number of economically insecure households with elements of vulnerability on dimension $j$.

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[13] The application of this measure, considering that each of the four indicators of economic vulnerability has equal weight, can be seen in the last lines of Table 2.

The $H$, $A$ and $M_0$ estimates were computed in Stata (Release 15.0, Stata Corporation) using the *mpi* command (Pacifico & Poege, 2017).

Using a normative approach to define the weighting structure

Using an appropriate weighting scheme for any compound index is crucial. Weights have critical importance in the construction of a measure of wellbeing because they determine the trade-off between the dimensions and/or indicators, which can significantly affect the conclusions derived from the index (Decancq & Lugo, 2013; Ravallion, 2012b). The weights given to the different sources of stress that the household has due to economic vulnerabilities are a determining factor in the definition of the index I propose.[14] There are several approaches to setting weights, which can be grouped into two types. The first are the data-driven approaches, which let the data 'speak for themselves' and depend solely on the distribution that the data being analysed provides. That is, data-driven weights are based on neither theoretical criteria nor value judgements regarding what the trade-offs should be between the dimensions and indicators. The second are the normative approaches, which define the weights based only on value judgements or conceptual frameworks of the dimensions of the phenomenon studied rather than the information that the distribution of the data matrix can provide.

There are two reasons for not using data-driven weighting strategies such as the principal component analysis (used by Rhode et al. (2015) to build the multidimensional index of economic insecurity in Australia) or frequency-based weights (used by Romaguera de la Cruz (2017) in her index for Spain). First, as mentioned in the previous section, the indicators that I use for Chile do not have a high correlation with each other, minimising the problem of double counting, which can capture the same latent dimension for two highly correlated indicators. The use of techniques based on principal component analysis has some drawbacks such as the difficulty in interpreting the combination between the indicators of the index, and in assigning a low weight to the dimensions that show a weak correlation, relying on mechanic justifications rather than theoretical ones (Decancq & Lugo, 2013).

Second, in countries like Chile that show a high percentage of economic vulnerability in all the

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[14] The decision on which cut-off to use to aggregate the vulnerabilities also has consequences for the results of the application of the index. However, unlike the weight structure, there is no clear cut-off rule to determine the appropriate cut to use in the index. The recommendation is to perform sensitivity analyses to find the proper value for $k$.

indicators, using frequency-based weights has no justification. The reason for using frequency-based weights is that households attach greater importance to vulnerabilities that do not affect most households. Besides, there are situations in which one dimension may have a significant impact on the population, but this does not mean the others with a lower impact are less important. For example, Brandolini (2007) found this type of inconsistency between dimensions such as health and education when using frequency-based weights to calculate a well-being index in Italy.

Within the normative approach, the equal weighting is the most commonly used approach to build multidimensional indices of well-being (e.g. Human Development Index (UNDP, 2018)). It is recommended when the dimensions used in the index are considered equally important or when dimensions that do not overlap are included. In my framework, the dimensions contain both characteristics. First, the vulnerability indicators are not highly correlated (see Table A.2 in the appendix). Second, each dimension has an adverse effect on the well-being of a household, and, to the best of my knowledge, there are no studies that have determined that an economic vulnerability (e.g., over-indebtedness) causes more stress or anxiety in the household members than another (e.g., unprotected employment). Therefore, by applying the same weight to each indicator of economic insecurity, I can treat them in the same way.

Thereby, I assign the weights using a normative approach to define two economic insecurity indices. The first uses uniform weights, that is, the index of economic insecurity that has four indicators (treated as dimensions) whose weight ($w_j$) takes the value of 1 for each of them. I call this measure the Multidimensional Economic insecurity index (MEII), which has the following expression:

$$MEII_i = \begin{cases} 1 \; if \; \sum_{j=1}^{V} w_j I_{ij} \geq k & \text{where } w_j = 1 \text{ and V } = \; 4 \\ \qquad\qquad 0 \text{ otherwise} \end{cases} \tag{7}$$

The second index also uses uniform weights. It classifies households as economically insecure using predefined combinations of two dimensions using three indicators (it does not include the over-indebtedness indicator). I have called this index the Integrated Economic Insecurity Index (IEII). I explain the IEII in detail below.

## 6. Drawbacks of multidimensional indexes of well-being

The development of multidimensional indexes of well-being has been accompanied by criticisms related to the methodology (Ravallion, 2011). However, the focus of the questioning has never been about the multidimensionality of phenomena such as poverty. The point in question is whether this multidimensionality can be adequately measured in a single index. There are many ways to build what Ravallion (2012a) calls mash up indices or ad-hoc aggregation depending on the available data and the distribution of the weights chosen by the researcher. For example, if the objective is to monitor and evaluate antipoverty programmes, and improve the targeting of social benefits, it is not clear how it is of added value to measure the dimensions in a scalar value versus the alternative of focusing on monitoring and improving the measurement of separate dimensions (e.g. consumption poverty, health poverty or education poverty). The main criticism to this approach is that the meaning, interpretation and robustness of these indices are often unclear.

A similar and more recent discussion has focused on the measurement of economic insecurity (Hacker, 2018; Osberg, 2018). Although the academic debate acknowledges that economic insecurity is a multidimensional phenomenon (Bucks, 2011; Osberg & Sharpe, 2014; Rohde et al., 2015; Romaguera de la Cruz, 2017) most of the analyses focus only on one of the dimensions of economic insecurity (Anderloni et al., 2012; Balestra & Tonkin, 2018; Białowolski, 2018; Bossert & D'Ambrosio, 2013; Keim et al., 2014; Rehm, 2016b; Rohde et al., 2014; Western et al., 2016).

In this context, Hacker at al. (2014, 2010) have made a significant contribution by proposing a hybrid measure to build an index that relates downside income insecurity to an insufficient financial safety net to buffer an unexpected economic loss. This measure, the Economic Security Index (ESI), offers policymakers a fully comprehensive measure of economic insecurity. To use the authors' own words, the integrated index is defined as "an annual index that represents the share of individuals who experience at least 25 per cent decline in their inflation-adjusted 'available household income' from one year to the next (except when entering retirement) and who lack an adequate financial security net to replace this income until it returns to its original level" (Hacker et al., 2014, p. 8).

This measure has been criticised for only considering private wealth as a buffer stock protection against an economic shock without including in the measurement the protective role of the state through social assistance or social insurance (e.g. the benefits of unemployment insurance or

workers' compensation) (Osberg, 2018). Two additional criticisms that Hacker (2018) himself has raised regarding this index have to do with problems usually present in one-dimensional income insecurity measurements that use a retrospective approach. First, these measures cannot identify whether the income drop is a voluntary decision made by the household (e.g. an early withdrawal by the head of household) or rather the result of unforeseen events faced by it.

Second, a measure based primarily on changes in household income omits aspects of economic insecurity that do not imply economic instability. For example, Hacker et al.'s (2014) index can indicate that a household is not financially insecure because it did not experience a large drop in income despite having a very low income, high indebtedness and very limited liquid financial wealth. This point acquires relevance in middle-income countries where a high proportion of the population can experience several economic vulnerabilities simultaneously, even if they have not experienced a recent fall in their income.

Building upon the discussion presented above, I propose an Integrated Economic Insecurity Index (IEII) to complement the Multidimensional Economic Insecurity Index (MEII) and, at the same time, to be considered as a reference to define the multidimensional threshold value ($k$) used in the MEII.

*An integrated measure of economic insecurity*

Another way to think about the hybrid measure that Hacker et al. (2014) propose to measure economic insecurity in the U.S. is the multidimensional approach. As mentioned before, the ESI measures the proportion of households that experienced a large drop in income or a large increase in out-of-pocket medical expenses and lacked liquid financial wealth to offset the economic loss. In the multidimensional approach, this measure is equivalent to a multidimensional economic insecurity rate ($H$) that has two indicators of vulnerability ($V=2$), using *uniform* weights, and a threshold set at two ($k=2$). The specifications of this simplified multidimensional index do not require estimating a multidimensional adjusted headcount ratio ($M_{EI}$) because in this particular case, the properties of dimensional monotonicity are fulfilled. For example, a household initially classified as economically insecure will be considered secure if it ceases to be vulnerable in either of the two dimensions.

The IEII that I propose also derives from the multidimensional approach. The IEII allows for

classifying a household as economically insecure in two scenarios. The first scenario is when the household has a high risk of experiencing a large income drop or a large expense increase and lacks at least one buffer to offset the economic loss (unprotected job or asset-poverty). This scenario is similar to the one proposed by Hacker et al. (2014, 2010) except for two features. First, it does not include voluntary economic losses (see section on the construction of indicators) and second, it considers social protection mechanisms of the welfare state by incorporating as a buffer the level of protection of the household's workers.

The second scenario is when the household lacks buffers that can protect it from an economic loss (that is, a household with unprotected workers that is also asset-poor). This scenario addresses the critique that Hacker (2018) himself poses to his index being unable to adequately distinguish households that are economically insecure in the lower part of the income distribution. For example, Hacker et al.'s (2014) index does not consider as economically insecure households that do not have a high risk of experiencing a significant income shock although they live in conditions of high vulnerability due to the lack of buffers to face economic losses. It is worth noting that unprotected work is highly correlated with low-income households; therefore, by including this buffer, I will be measuring a source of economic insecurity characteristic of this group of the population.

The measurement of this second scenario does not include over-indebtedness as a buffer. There are two reasons for not doing so: first, so as not to complicate the IEII and, second, to avoid including a criterion that is highly demanding in regard to classifying households as economically insecure. In other words, I want to prevent the IEII from considering households as financially secure when they are not over-indebted while they are asset-poor, and when their members are workers without labour protection. Besides, the smallest contribution of over-indebtedness in the measure of multidimensional insecurity is in the lower part of the income distribution (see Table 5). A classification that includes this indicator along with the other two buffers would report a lower proportion of economically insecure households in that part of the income distribution, compromising the goal of improving the measurement of economic insecurity among low-income households.

The IEII classification enables me to represent in a single scale the risk of unbuffered economic loss from two major dimensions of economic well-being: i) household risk to an unexpected economic event, and ii) lack of buffers to offset the potential economic loss. This definition of

economic insecurity offers a more comprehensive interpretation than that of the MEII, at the cost of not including the over-indebtedness indicator in the index, thus losing the information that this source provides about households' stress.

In formal terms, the IEII is a uniform weighting structure with equal values for the weights and a fixed $k$. The weights values and the threshold are chosen so that the index can classify the households according to the two scenarios of economic insecurity predefined in the integrated measure. In this way the IEII is defined by the following expression:

$$IEII_i = \begin{cases} 1 \; if \; \sum_{j=1}^{V} w_j I_{ij} \geq 2 & \text{where } w_j = 1 \text{ and } V = 3 \\ \qquad\qquad 0 \text{ otherwise} \end{cases} \tag{8}$$

With these specifications, a household is economically insecure if it has i) a high risk of facing an economic shock and lacks at least one of the two buffers or ii) lacks the two buffers.

## 7. Results

*General analysis of economic insecurity measures*

Here I present the results at the household level of the economic insecurity measures that I have proposed, and I discuss why these results justify using the MEII over the IEII to understand the economic insecurity in Chile. Figure 3 shows the aggregate measure ($M_0$) of the MEII for different thresholds ($k$). For the years 2007 and 2011, the confidence intervals overlap for each of the cut-offs, thereby presenting no significant differences in the $M_0$. For $k = 1$, the value of $M_0$ for those two years is 0.4, reaching 0.02 when the household experiences the four vulnerabilities at the same time. When analysing the period 2014-2017, the values of $M_0$ are statistically different when the cut-off corresponds to two vulnerabilities ($k = 2$). This shows that the economic insecurity behaviour follows a U shape, that is, there is a significant drop in economic insecurity between 2011 and 2014, which is then followed by an increase in the MEII between 2014 and 2017.

Figure 3: Adjusted multidimensional economic insecurity rate (M₀) using uniform weights by number of $k$ cut-off (Chile, 2007-2017)
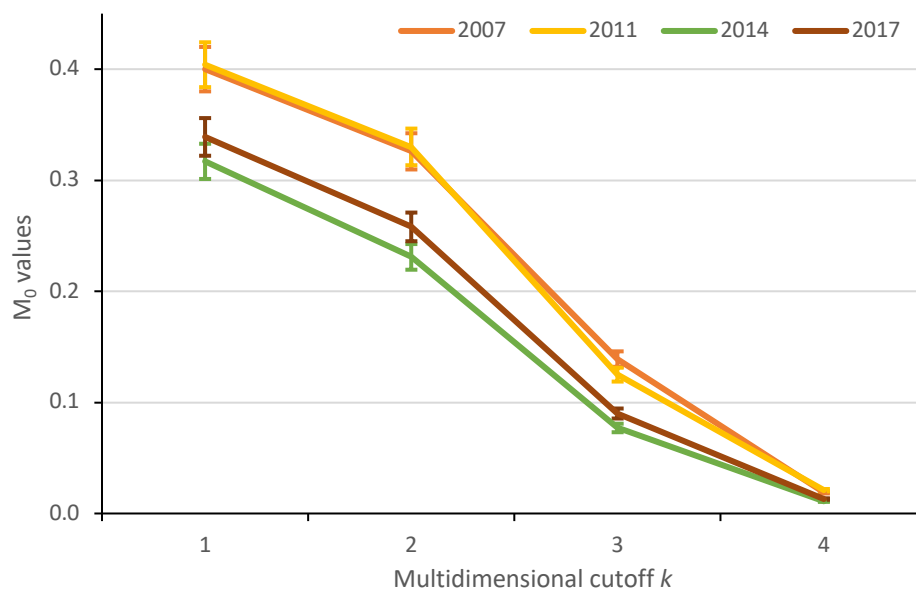


Source: Author's calculations based on the Chilean Survey of Household Finances (2007, 2011, 2014 and 2017).

To calculate the MEII I use $k = 2$, a threshold that, as shown in Figure 3, distinguishes significant changes in the economic insecurity of Chilean households after the Great Recession in 2008/2009. These changes range from an $M_0$ of 0.330 in 2011 to 0.258 in 2017, where the lowest level of economic insecurity was observed in 2014, with a value of 0.231.

Table 4: Measurements of economic insecurity in Chile, 2007-2017

| Index defined by weights and threshold | Year | H (incidence of economic insecurity) | Std. Err. | A (intensity of economic insecurity) | Std. Err. | $M_0$ (adjusted multidimensional economic insecurity rate) | Std. Err. |
|---|---|---|---|---|---|---|---|
| MEII (Multidimensional Economic insecurity index) | 2007 | 0.554 | 0.012 | 0.590 | 0.005 | 0.326 | 0.007 |
| | 2011 | 0.569 | 0.009 | 0.579 | 0.004 | 0.330 | 0.006 |
| | 2014 | 0.406 | 0.012 | 0.568 | 0.005 | 0.231 | 0.007 |
| Four dimensions, uniform weights and k=2 | 2017 | 0.451 | 0.010 | 0.571 | 0.004 | 0.258 | 0.006 |
| | Δ 2007-2017 | -0.103 | ** | -0.019 | * | -0.068 | ** |
| IEII (Integrated Economic insecurity index) | 2007 | 0.505 | 0.012 | 0.740 | 0.005 | 0.374 | 0.009 |
| | 2011 | 0.526 | 0.010 | 0.728 | 0.004 | 0.383 | 0.007 |
| | 2014 | 0.348 | 0.011 | 0.710 | 0.004 | 0.247 | 0.008 |
| Two dimension and three indicators, uniform weights and k=2 | 2017 | 0.384 | 0.010 | 0.713 | 0.004 | 0.274 | 0.007 |
| | Δ 2007-2017 | -0.121 | ** | -0.027 | * | -0.10 | ** |

Source: Author's calculations based on the Chilean Survey of Household Finances (2007, 2011, 2014 and 2017).

Table 4 compares the MEII values for $k = 2$ with the aggregate measures for the IEII ($H$ and $M_0$). In both measures, a similar trend was observed during the decade, but with values slightly higher in the MEII than the IEII. This difference can be seen in 2014 and 2017, where the incidence in the MEII is approximately 15 per cent higher than in the IEII. It is important to note that the MEII outcomes for other values of $k$ are quite different from the IEII outcomes (see table A2 in the annexes), being the cut-off of two vulnerabilities the one that constructs a multidimensional measure with values similar to those of IEII.

A second difference between the two measures of economic insecurity is that the MEII seems to be a more smoothed measure than the IEII in both the incidence and the adjusted multidimensional economic insecurity rate. This is most clearly seen between 2011 and 2014, where both measures capture the sharp decline in economic insecurity, yet the IEII incidence presents a reduction of 36 per cent, whereas the MEII indicates that the fall was 30 per cent.

The third difference between the two measures of economic insecurity, already mentioned above, lies in their interpretation. While the MEII aggregate measures are constructed from the combination of one, two, three and four vulnerabilities (depending on the cut-off ($k$) chosen), the

IEII informs us more comprehensively about the relationship between the three economic insecurities of the household. For the IEII, households are vulnerable for two reasons: i) having a high risk of facing an economic shock without having at least one of the two buffers to offset the economic loss, or ii) experiencing the lack of these two buffers at the same time (unprotected employment and asset poverty). However, when the MEII uses the cut-off of two vulnerabilities ($k = 2$), this not only contains the two mentioned scenarios of the IEII but also allows over-indebtedness to be included as an indicator. The MEII provides greater flexibility than the IEII by applying a cut-off of two vulnerabilities to the four indicators. This makes it possible to classify economic insecurity more adequately for households in the lower part of the income distribution. For example, the MEII classifies a household as economically insecure if its workers are not protected from dismissal and are asset-poor without necessarily being over-indebted.

All three differences discussed above allow me to suggest that an MEII with a multidimensional cut of two ($k = 2$) is the most appropriate measure of economic insecurity to apply to Chile. The analyses that follow make use of the decomposition benefits of the aggregate measure $M_0$. From now on I will only refer to the aggregated results ($H$, $I$, and $M_0$.) delivered by this measure.

*Disaggregated analysis by dimensions, income decile groups and family types*

Table 4 shows that the changes in the adjusted multidimensional economic insecurity rate ($M_0$) are explained more by variations in the incidence ($H$) (over 12 per cent between 2007 and 2017), than by changes in the intensity ($I$) of the vulnerabilities (less than 3 per cent for the same period). This result raises the question of what the contribution of each of the indicators is to $M_0$, and how this contribution changed over the decade studied.

Figure 4 illustrates the evolution of the composition of $M_0$. In the four measurements obtained between 2007/2017, asset poverty is the dimension that contributes the most to economic insecurity, with an average of 40 per cent. The second most important component of the $M_0$ for all households is unexpected economic shocks, with an average of 28 per cent. In third place is unprotected employment, with an average of 21 per cent. Finally, the component with the lowest contribution to the aggregated measure of the MEII is over-indebtedness, at 11 per cent. Yet, it is worth noting that this dimension is the only one out of the four dimensions considered that increased its contribution over the decade (from 10.4 per cent in 2007 to 13.8 per cent in 2017). The changes in the compositions of the other three dimensions become more apparent from 2011

onwards; the contribution of economic shocks increases, and the lack of buffers (asset poverty and unprotected employment) decreases. In 2017 the relative $M_0$ composition of these three dimensions was 28.8, 39.4 and 18.1 per cent respectively.

Figure 4: Evolution of the relative composition of MEEI ($M_0$) in Chile, 2007-2017
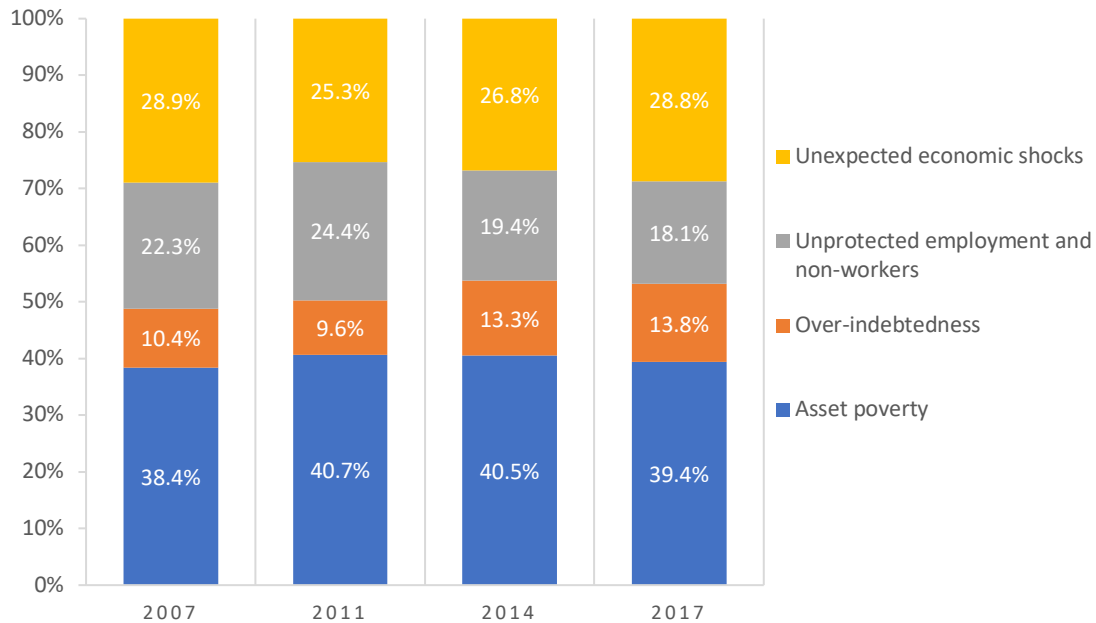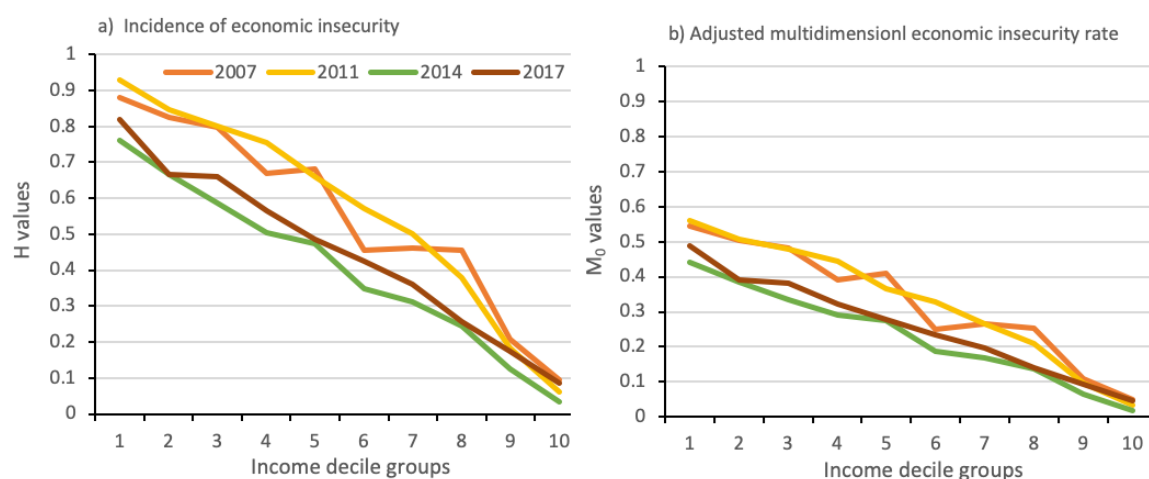


Source: Author's calculations based on the Chilean Survey of Household Finances (2007, 2011, 2014 and 2017).
Notes: The MEII (Multidimensional Economic insecurity index) uses uniform weights and k=2

Figure 5 shows the aggregate MEII measures for the years 2007, 2011, 2014, 2017 by income decile group. The results show two relevant phenomena. First, economic insecurity affects the whole population. The results show high levels of economic insecurity across the entire income distribution. Although the economic insecurity is much higher in the lower part of the income distribution, the incidence in the decile groups of the upper part of the distribution is relatively high as well. Panel A in Figure 5 shows that during the years 2007 and 2011 the average incidence of the MEII was around 80 per cent for the first two income decile groups, while in the two highest income decile groups (9 and 10) was 12 per cent. This contrasts with the results from the only study that has carried out a similar analysis using a multidimensional index (Romaguera de la Cruz, 2017). This author found that in Spain, the $M_0$ for deciles 9 and 10 was less than 1 per cent. Although this comparison is not strictly accurate since the period analysed was between 2009/2015 and the index was not built with the same indicators, it allows for emphasising the fact that economic insecurity in Chile is not bounded to the lower income groups.

This result is particularly interesting when comparing the concept of economic insecurity with that of vulnerability to poverty (risk of falling into poverty). Poverty vulnerability analyses indicate that in Chile, only the highest income decile groups (9 and 10) have a near zero risk of falling into poverty. This means that a low risk in terms of vulnerability to poverty does not exempt households or individuals from the risk of curtailing their well-being, a risk that is associated with significant stress at the household level.

Figure 5: Aggregate measures of MEII by income decile groups in Chile, 2007-2017



Source: Author's calculations based on the Chilean Survey of Household Finances (2007, 2011, 2014 and 2017).

The second phenomenon that the results show is that although in Chile the levels of economic insecurity are high, these decreased significantly between 2011 and 2014. Figure 5 shows that this reduction is reflected throughout the first eight income decile groups in both aggregated measures ($H$ and $M_0$). The highest income decile groups (9 and 10) show no significant changes. As noted, this decrease in economic insecurity is coupled with good macroeconomic performance between those years: economic growth of 4.4 per cent on average and a decrease in informal work of almost 5 per cent.

Taking advantage of the decomposition properties of one of the MEII's aggregated measures, I analyse the contribution of the dimensions to economic insecurity according to households' position in the distribution of income. And, more specifically, I analyse whether the composition of the four dimensions in the index differs between the extremes of the income distribution. Table 5 shows the adjusted multidimensional economic insecurity rate ($M_0$) for the year 2017 by income decile group.

Table 5: Relative contribution to $M_0$ by income decile group in Chile, 2017

| Income decile groups | $M_0$ (adjusted multidimensional economic insecurity rate) | Relative contribution to $M_0$ | | | |
| --- | --- | --- | --- | --- | --- |
| | | Unexpected economic shocks | Unprotected employment or non-workers | Over-indebtedness | Asset poverty |
| 1 | 0.490 | 0.178 | 0.346 | 0.078 | 0.397 |
| 2 | 0.390 | 0.257 | 0.253 | 0.097 | 0.393 |
| 3 | 0.383 | 0.304 | 0.169 | 0.131 | 0.396 |
| 4 | 0.322 | 0.319 | 0.143 | 0.137 | 0.401 |
| 5 | 0.278 | 0.366 | 0.097 | 0.157 | 0.380 |
| 6 | 0.235 | 0.364 | 0.107 | 0.158 | 0.371 |
| 7 | 0.198 | 0.355 | 0.060 | 0.174 | 0.412 |
| 8 | 0.139 | 0.351 | 0.076 | 0.164 | 0.409 |
| 9 | 0.092 | 0.197 | 0.057 | 0.338 | 0.408 |
| 10 | 0.046 | 0.199 | 0.156 | 0.312 | 0.333 |

Source: Author's calculations based on the Chilean Survey of Household Finances 2017.

For the year 2017, the contribution of unexpected economic shocks is higher between deciles 3 and 8 than at the extremes of the income distribution. In the case of asset poverty, the contribution is relatively constant. It does not seem to be related to income decile, except in the highest income decile group (10), where the contribution falls to 33 per cent. The indicator unprotected employment or non-workers in the household is important in the lower part of the income distribution, and its contribution falls in the highest deciles. Conversely, over-indebtedness is more relevant for households at the top of the distribution, which reveals that over-indebtedness, falling revenues or increased expenditure are sources of greater stress among households with a higher income in Chile.

The breakdown of the MEII aggregate measures into subgroups of the population also makes it possible to identify the types of families with the highest levels of economic insecurity. From the perspective of public policy design, this information is relevant because it allows for identifying where and how to focus public resources to reduce household stress due to economic vulnerabilities, thus complementing other welfare measures that are traditionally used in the targeting of social policies.

Figure 6: Incidence of economic insecurity (*H*) by family type in Chile, 2007-2017
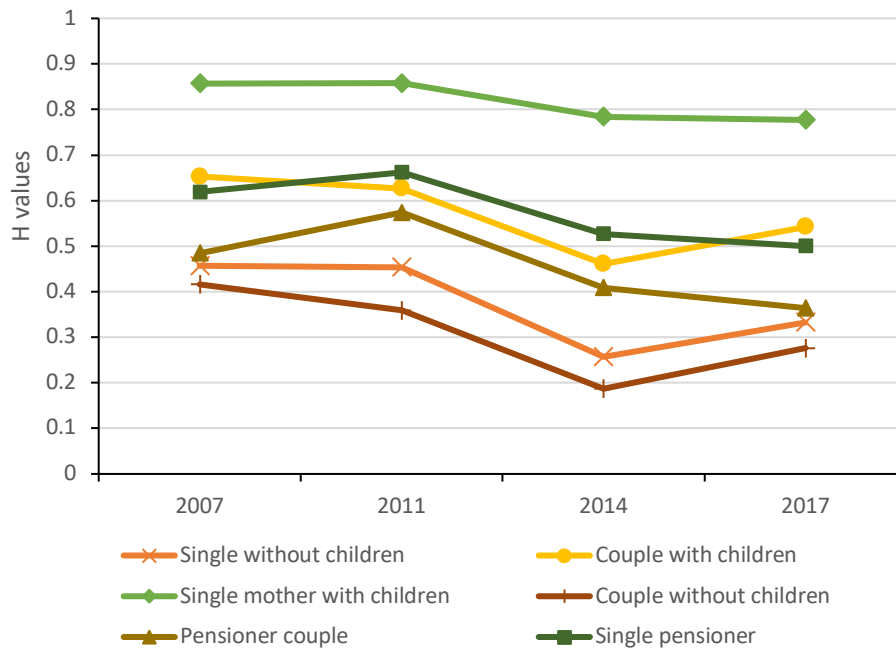


Source: Author's calculations based on the Chilean Survey of Household Finances (2007, 2011, 2014 and 2017).

Figure 6 shows the incidence of economic insecurity in Chile between 2007 and 2017, broken down by population subgroup. The three groups with the highest rate of economic insecurity are households composed by i) a single mother with children; ii) couple with children, and iii) a single pensioner. Around 8 out of 10 single mother with children households experienced economic insecurity during the decade analysed. The other two subgroups show rates close to 65 per cent in 2007. Although by 2017 these rates had declined to around 52 per cent. The high economic insecurity of these three types of families correlates with other welfare deprivation measures such as vulnerability to income poverty (López-Calva & Ortiz-Juarez, 2014). In this way, the application of the MEII informs policymakers that more than half of these households have been under economic stress during the last decade in Chile.

*Understanding the determinants of the economic insecurity in Chile*

In this last section of the results, I analyse the relationship between economic insecurity and some significant households' characteristics variables. I use a probit model to estimate the probability of a household being economically unsafe. The dependent variable is the definition of the MEII for a cut-off of two vulnerabilities. The multivariate model was applied to pooled data from SHF household samples for the years 2007, 2011, 2014 and 2017. Specifically, my interest is in

identifying the average marginal effect (AME) that each of the socioeconomic characteristics of the household has on economic insecurity for the studied period. Table 6 shows these estimates

Regarding the features of heads of households, i.e. gender, age and education, the results show first, that households headed by women are more vulnerable than households headed by men (7.7 per cent). An explanation of this result could be the gender inequalities that the Chilean labour market exhibits (participation, stability and wages). Second, the age of the head of the household was not a significant variable. This result shows that the economic insecurity throughout the decade was transverse to the life cycle of households. Finally, it is worth noting that households with heads of households that have a university degree have a significantly reduced risk of being economically vulnerable. The AME for heads of households with a university degree was 26.0 per cent.[15]

As to the variables related to households' characteristics, i.e. type of family, number of children, number of members working, the results in Table 6 show that two types of households have a higher risk of being economically insecure compared to households with couples without children. In the case of households with a single mother with children, the risk is 27.3 per cent, while for couples with children is 11.8 per cent. These results are aligned with those presented in Figure 6, providing significant evidence of the need to direct support through tailored policies to these types of families to alleviate the stress and anxiety they experience. It is important to mention that during the last decade, Chile has been increasing the cash transfer through its family benefit programs, reaching 0.7 per cent of GDP in 2015 (Tromben & Podestá, 2019, p. 59). However, this percentage is still below the average of 1.2 percent from OECD countries.

Second, regarding the number of children in the household, an additional child increases the probability of a household being economically insecure by 3.1 per cent. Third, the number of workers in the household has a reverse effect and is significant. When a member of the household gets a job the probability of the household being economically insecure decreases by 11.0 per cent. Finally, when a household rents their home this increases their probability of being economically vulnerable by 17.9 percent compared to a household that owns their home. Since housing was not included as a measure of asset poverty, this result does not have a mechanical explanation but rather directly relates this characteristic of the household to the level of insecurity that it experiences.

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[15] In other words, in average the probability of these households is around 25 per cent higher than of head of households that only completed secondary school.

Table 6: Average marginal effects on probability of a household being economic insecure for significant variables

| Variables | Pooled data | |
|---|---|---|
| | AME | Std. Dev. |
| *Household head characteristics* | | |
| Female | 0.077 *** | (0.017) |
| Age: Ref.45 to 54 years | | |
| Under 35 years | -0.024 | (0.022) |
| 35 to 44 years | -0.010 | (0.021) |
| 55 to 64 years | -0.025 | (0.024) |
| 65 years and more | 0.049 | (0.051) |
| Education: Ref. Secondary school | | |
| Primary school | 0.079 *** | (0.020) |
| University degree | -0.260 *** | (0.014) |
| *Household characteristics* | | |
| Household type: Ref. Couple without children | | |
| Single without children | 0.016 | (0.023) |
| Couple with children | 0.118 *** | (0.029) |
| Single mother with children | 0.273 *** | (0.040) |
| Pensioner couple | -0.081 | (0.050) |
| Single pensioner | -0.093 * | (0.050) |
| Number of children < 15 | 0.031 ** | (0.014) |
| Number of workers | -0.110 *** | (0.007) |
| Housing: Ref. Own housing (no mortgage) | | |
| Own housing, mortgage | 0.179 *** | (0.016) |
| Rent | 0.012 | (0.021) |

Source: Author's calculations based on the Chilean Survey of Household Finances (2007, 2011, 2014 and 2017).

Notes: I present average marginal effects for probit estimations in which the dependent variable is the Multidimensional Economic Insecurity Index (MEII). *** significance at 1 percent; ** significance at 5 percent; * significance at 1 percent.

**4.8 Conclusions**

In this chapter, I have studied both the nature and evolution of economic insecurity in Chile over the last ten years (from 2007 to 2017). To carry out this analysis, I have constructed the Multidimensional Economic Insecurity Index (MEII) combining four sources of economic insecurity causes stress and anxiety: unexpected economic shocks, unprotected employment, over-indebtedness and asset poverty. In this way, the MEII offers a measure at the household level that directly relates economic uncertainty to stress due to the lack of both social protection and buffers to face unexpected economic shocks.

Until now only integrated measures of economic insecurity, such as that proposed by Hacker et al., (2014) have used this two-dimensional conceptual framework in the construction of an index. Other indices have focused on the objective and subjective dimensions of economic insecurity or only on one of its dimensions, such as large income drops or level of household wealth. The MEII that I propose incorporates sources of stress and anxiety that are characteristic of households located at the two ends of the income distribution in middle-income countries. This is the case for the unprotected jobs at the bottom of the distribution, and the over-indebtedness at the top. In this way, the MEII becomes a more versatile and useful tool for the diagnosis and design of social policies for the reality of countries such as Chile and others that are similar in the Latin American region. Furthermore, using a multidimensional approach to construct the MEII not only allows me to analyse the incidence and intensity of economic insecurity but also to decompose the index by dimension or subpopulation.

After selecting the appropriate vulnerability cut-off to the MEII and validating its results with an integrated index *à la* Hacker et al., (2014) I propose a cut-off of two vulnerabilities and four indicators with uniform weights to analyse the level and intensity of economic insecurity in Chile. Applying this measure to the data from the Household Financial Survey shows that during the decade studied, economic insecurity, on average, affected almost 50 per cent of urban households in Chile, with an intensity of 2.3 out of 4 indicators. By taking into account both incidence and intensity, I obtain an adjusted rate of average economic insecurity of 0.286. Although in the period of the economic crisis the level of insecurity did not change (measures taken in 2007 and 2011), its evolution in the subsequent years shows U-shaped behaviour where a significant fall in economic insecurity between 2011 and 2014 is followed by an increase between 2014 and 2017. This result shows a negative correlation with the country's economic cycle. Other macroeconomic indicators

also correlate with some of the indicators that make up the MEII, for example, the reduction of the levels of labour informality with the unprotected unemployment indicator, and the constant increase in the bank private credit rate with the over-indebtedness indicator.

When considering the entire population, asset poverty is the indicator that contributes the most to economic insecurity. The other indicators follow in this order: unexpected economic shocks, unprotected employment, and over-indebtedness. Although insecurity is present throughout the income distribution, the composition of the four indicators varies according to the position of the household in the income deciles. Thus, although the asset-poverty contribution is similar throughout the income distribution, unprotected employment is more relevant in the lower deciles, while unexpected economic shocks and over-indebtedness make a more significant contribution in the higher deciles.

The main determinants of economic insecurity are households headed by women who have children. Also, heads of households with low educational levels who work without a contract increase the household's risk of being affected by economic insecurity. The number of workers in the household is the most critical determinant to predict their economic insecurity. These results are similar to studies that have used other economic welfare measures such as vulnerability to poverty. This allows for relating these forms of socioeconomic disadvantage to exposure to economic stress. In this way, one could argue that policies that seek to reduce the economic risk in the poorest households fulfil several desirable objectives simultaneously.

The most significant difference between these welfare measures is that economic insecurity affects the entire income distribution, while the other measures do not provide relevant information on the highest deciles. The high economic insecurity experienced by all income groups finds an explanation in two critical and intertwined conditions: firstly, the low level of income and wealth collected through household surveys, even of those in decile groups 9 and 10, which are not enough to protect individuals from the stress of future economic shocks; and secondly, the weak social protection system, which is incapable of working as a buffer to offset households' economic insecurity. It is worth noting that in 2015 the OECD ranked Chile as having the greatest economic vulnerability among its members, for almost 8 out of every 10 Chileans did not have liquid financial wealth to face a sudden adverse economic shock. In that same year a new reform was made to the unemployment insurance system based on individual savings to increase insurance coverage for a greater proportion of the unemployed.

By identifying the groups of households most affected by economic insecurity and its trend in recent years, the application of the MEII in countries such as Chile provides relevant information to monitor, evaluate and improve social safety nets together with labour market regulations. Although this welfare measure has been criticised for not considering the fact that the perception of economic vulnerability varies among households, it is important to acknowledge that the contexts in which households decide to avoid or increase their economic risks are determined and informed by the support scheme offered through social policies. The question that arises is, what is the base level of hazard that as a society we want to have? In the case of Chile, to a certain extent, the state shares with people the financial risk of hazards such as unemployment or illness, through programmes such as unemployment insurance or public health insurance. Households decide how to cope with the additional costs of an illness or unemployment taking into consideration information about programme benefits (if eligible) and their own resources. However, regardless of the level of risk aversion on the part of the household, social policies should be able to effectively address economically insecure households, generating a more complete social welfare system than the current one.

# 9. References

Aaberge, R., & Brandolini, A. (2015). Multidimensional poverty and inequality. In *Handbook of income distribution* (Vol. 2, pp. 141–216). Elsevier.

Adda, J., Banks, J., & Von Gaudecker, H.-M. (2009). The impact of income shocks on health: Evidence from cohort data. *Journal of the European Economic Association*, *7*, 1361–1399.

Adler, M. D., & Fleurbaey, M. (2016). *The Oxford Handbook of Well-Being and Public Policy*. Oxford University Press.

Alkire, S., & Foster, J. (2011). Counting and multidimensional poverty measurement. *Journal of Public Economics*, *95*, 476–487.

Alkire, S., & Santos, M. E. (2014). Measuring Acute Poverty in the Developing World: Robustness and Scope of the Multidimensional Poverty Index. *World Development*, *59*, 251–274.

Ambrey, C. L., Fleming, C. M., & Manning, M. (2014). Perception or Reality, What Matters Most When it Comes to Crime in Your Neighbourhood? *Social Indicators Research*, *119*, 877–896. JSTOR.

Anderloni, L., Bacchiocchi, E., & Vandone, D. (2012). Household financial vulnerability: An empirical analysis. *Research in Economics*, *66*, 284–296.

Atkinson, A. (2003). Multidimensional deprivation: Contrasting social welfare and counting approaches. *The Journal of Economic Inequality*, *1*, 51–65.

Azzopardi, D., Fareed, F., Lenain, P., & Sutherland, D. (2019). Assessing Household Financial Vulnerability: Empirical evidence from the US using machine learning. In *OECD Economic Survey of the United States: Key Research Findings*.

Baez, J. E., Fuchs, A., & Rodriguez-Castelan, C. (2017). *Shaking Up Economic Progress*. Washington, DC: World Bank.

Balestra, C., & Tonkin, R. (2018). *Inequalities in household wealth across OECD countries: Evidence from the OECD Wealth Distribution Database* (OECD Statistics Working Papers No. 2018/01). Paris: OECD Publishing.

Bertrand, M., & Mullainathan, S. (2001). Do People Mean What They Say? Implications for Subjective Survey Data. *The American Economic Review*, *91*, 67–72.

Białowolski, P. (2018). Hard Times! How do Households Cope with Financial Difficulties? Evidence from the Swiss Household Panel. *Social Indicators Research*, *139*, 147–161.

Białowolski, P., & Weziak-Bialowolska, D. (2014). The Index of Household Financial Condition, Combining Subjective and Objective Indicators: An Appraisal of Italian Households. *Social Indicators Research*, *118*, 365–387. JSTOR.

Birdsall, N., Lustig, N., & Meyer, C. J. (2014). The Strugglers: The New Poor in Latin America? *World Development*, *60*, 132–146.

Bossert, W., & D'Ambrosio, C. (2013). Measuring Economic Insecurity. *International Economic Review*, *54*, 1017–1030.

Brandolini, A. (2007). *On synthetic indices of multidimensional well-being: Health and income inequalities in France, Germany, Italy and the United Kingdom* (No. 668). Bank of Italy.

Brandolini, A., Magri, S., & Smeeding, T. M. (2010). Asset-based measurement of poverty. *Journal of Policy Analysis & Management*, *29*, 267–284.

Bridges, S., & Disney, R. (2010). Debt and depression. *Journal of Health Economics*, *29*, 388–403.

Brown, S., Taylor, K., & Wheatley Price, S. (2005). Debt and distress: Evaluating the psychological cost of credit. *Journal of Economic Psychology*, *26*, 642–663.

Bucks, B. (2011). *Economic vulnerability in the United States: Measurement and trends*. Presented at the Paper prepared for the IARIW-OECD conference on Economic Insecurity, Paris.

Cafiero, C., & Vakis, R. (2006). *Risk and Vulnerability Considerations in Poverty Analysis: Recent Advances and Future Directions.–The World Bank Social Protection* (p. 31) [0610,]. Washington, DC: World Bank.

Cantó, O., García-Pérez, C., & Romaguera de la Cruz, M. (2019). *Economic insecurity in the EU using a multidimensional approach* (No. 336). ECINEQ.

Caroli, E., & Godard, M. (2016). Does job insecurity deteriorate health? *Health Economics*, *25*, 131–147.

Cheng, G. H.-L., & Chan, D. K.-S. (2008). Who Suffers More from Job Insecurity? A Meta-Analytic Review. *Applied Psychology: An International Review*, *57*, 272–303.

Clark, A. E., & Georgellis, Y. (2013). Back to Baseline in Britain: Adaptation in the British Household Panel Survey. *Economica*, *80*, 496–512.

Clayton, M., Liñares-Zegarra, J., & Wilson, J. O. S. (2015). Does debt affect health? Cross country evidence on the debt-health nexus. *Social Science & Medicine*, *130*, 51–58.

D'Ambrosio, C. (Ed.). (2018). *Handbook of Research on Economic and Social Well-Being*. Edward Elgar Publishing.

Decancq, K., & Lugo, M. A. (2013). Weights in Multidimensional Indices of Wellbeing: An Overview. *Econometric Reviews*, *32*, 7–34.

Espinosa, J., Friedman, J., & Yevenes, C. (2014). Adverse Shocks and Economic Insecurity: Evidence from Chile and Mexico. *Review of Income and Wealth*, *60*, S141–S158.

Ferreira, F., Messina, J., Rigolini, J., López-Calva, L., Lugo, M. A., & Vakis, R. (2013). *Economic Mobility and the Rise of the Latin American Middle Class*. Washington, DC: World Bank.

Ferrie, J. E., Shipley, M. J., Newman, K., Stansfeld, S. A., & Marmot, M. (2005). Self-reported job insecurity and health in the Whitehall II study: Potential explanations of the relationship. *Social Science & Medicine*, *60*, 1593–1602.

García-Pérez, C., González-González, Y., & Prieto-Alaiz, M. (2017). Identifying the Multidimensional Poor in Developed Countries Using Relative Thresholds: An Application to Spanish Data. *Social Indicators Research*, *131*, 291–303.

García-Pérez, C., Prieto-Alaiz, M., & Simón, H. (2017). A New Multidimensional Approach to Measuring Precarious Employment. *Social Indicators Research; Dordrecht*, *134*, 437–454.

Green, F. (2011). Unpacking the misery multiplier: How employability modifies the impacts of unemployment and job insecurity on life satisfaction and mental health. *Journal of Health Economics*, *30*, 265–276.

Greenhalgh, L., & Rosenblatt, Z. (1984). Job Insecurity: Toward Conceptual Clarity. *The Academy of Management Review*, *9*, 438–448.

Guérin, I., Morvant-Roux, S., & Villarreal, M. (2013). *Microfinance, Debt and Over-Indebtedness: Juggling with Money*. Routledge.

Hacker, J. S. (2018). Economic Security. In OECD (Ed.), *For Good Measure: Advancing Research on Well-being Metrics Beyond GDP*. Paris: OECD Publishing.

Hacker, J. S. (2019). *The Great Risk Shift: The New Economic Insecurity and the Decline of the American Dream, Second Edition*. Oxford University Press.

Hacker, J. S., Huber, G. A., Nichols, A., Rehm, P., Schlesinger, M., Valletta, R., & Craig, S. (2014). The Economic Security Index: A New Measure for Research and Policy Analysis. *Review of Income & Wealth*, *60*, S5–S32.

Hacker, J. S., Huber, G. A., Rehm, P., Schlesinger, M., & Valletta, R. (2010). *Economic Security at Risk: Findings from the Economic Security Index*. Rockefeller Foundation, Yale University.

Hacker, J. S., Rehm, P., & Schlesinger, M. (2013). The Insecure American: Economic Experiences, Financial Worries, and Policy Attitudes. *Perspectives on Politics*, *11*, 23–49. JSTOR.

Hansen, N.-J. H., & Sulla, M. O. (2013). *Credit growth in Latin America: Financial development or credit boom?* International Monetary Fund.

Hardy, B. L. (2014). Childhood Income Volatility and Adult Outcomes. *Demography*, *51*, 1641–1665. JSTOR.

Haveman, R., & Wolff, E. N. (2004). The concept and measurement of asset poverty: Levels, trends and composition for the U.S., 1983-2001. *Journal of Economic Inequality*, *2*, 145–169.

Hendren, N. (2017). Knowledge of Future Job Loss and Implications for Unemployment Insurance. *American Economic Review*, *107*, 1778–1823.

HFCN. (2016). *The Household Finance and Consumption Survey: Methodological report for the second wave* (No. 17). European Central Bank.

Hill, H. D., Morris, P., Gennetian, L. A., Wolf, S., & Tubbs, C. (2013). The Consequences of Income Instability for Children's Well-Being. *Child Development Perspectives*, *7*, 85–90.

Hojman, D. A., Miranda, Á., & Ruiz-Tagle, J. (2016). Debt trajectories and mental health. *Social Science & Medicine*, *167*, 54–62.

Huang, G.-H., Lee, C., Ashford, S., Chen, Z., & Ren, X. (2010). Affective Job Insecurity: A Mediator of Cognitive Job Insecurity and Employee Outcomes Relationships. *International Studies of Management & Organization*, *40*, 20–39.

ILO (Ed.). (2004). *Economic security for a better world*. Geneva: International Labour Office.

ILO. (2013). *Labour Overview 2013: Latin America and the Caribbean* [Informe]. Lima: ILO Regional Office for LAC.

Jahedi, S., & Méndez, F. (2014). On the advantages and disadvantages of subjective measures. *Journal of Economic Behavior & Organization*, *98*, 97–114.

Jenkins, S. P., Brandolini, A., Micklewright, J., & Nolan, B. (2013). *The Great Recession and the Distribution of Household Income*. OUP Oxford.

Kakwani, N., & Silber, J. (Eds.). (2007). *Many Dimensions of Poverty*. Palgrave Macmillan, London.

Keim, A. C., Landis, R. S., Pierce, C. A., & Earnest, D. R. (2014). Why do employees worry about their jobs? A meta-analytic review of predictors of job insecurity. *Journal of Occupational Health Psychology*, *19*, 269–290.

Kennickell, A. B., & Woodburn, R. L. (1999). Consistent weight design for the 1989, 1992 and 1995 SCFs, and the distribution of wealth. *Review of Income & Wealth*, *45*, 193–215.

Kim, S., & Koh, K. (2018). *Does Health Insurance Make People Happier? Evidence from Massachusetts' Healthcare Reform*. 41.

Kopasker, D., Montagna, C., & Bender, K. A. (2018). Economic insecurity: A socioeconomic determinant of mental health. *SSM - Population Health*, *6*, 184–194.

Krueger, A. B., & Schkade, D. A. (2008). The reliability of subjective well-being measures. *Journal of Public Economics*, *92*, 1833–1845.

László, K. D., Pikhart, H., Kopp, M. S., Bobak, M., Pajak, A., Malyutina, S., … Marmot, M. (2010). Job insecurity and health: A study of 16 European countries. *Social Science & Medicine*, *70*, 867–874.

Lee, C., Huang, G.-H., & Ashford, S. J. (2018). Job Insecurity and the Changing Workplace: Recent Developments and the Future Trends in Job Insecurity Research. *Annual Review of Organizational Psychology and Organizational Behavior*, *5*, 335–359.

López-Calva, L., & Ortiz-Juarez, E. (2014). A vulnerability approach to the definition of the middle class. *Journal of Economic Inequality*, *12*, 23–47.

Manski, C. F. (2004). Measuring Expectations. *Econometrica*, *72*, 1329–1376. JSTOR.

Matos, P. R. F. (2017). On the Latin American Credit Drivers. *Emerging Markets Finance and Trade*, *53*, 306–320.

McEwen, B. S., & Gianaros, P. J. (2010). Central role of the brain in stress and adaptation: Links to socioeconomic status, health, and disease. *Annals of the New York Academy of Sciences*, *1186*, 190–222.

McWilliams, J. M. (2009). Health Consequences of Uninsurance among Adults in the United States: Recent Evidence and Implications. *The Milbank Quarterly*, *87*, 443–494.

Ministerio Desarrollo Social. (2015). *Nueva Metodología de Medición de la Pobreza por Ingresos y Multidimensional* (No. 28). Santiago, Chile: Observatorio Social, Ministerio de Desarrollo Social.

Muenster, E., Rueger, H., Ochsmann, E., Letzel, S., & Toschke, A. M. (2011). Association between overweight, obesity and self-perceived job insecurity in German employees. *BMC Public Health*, *11*, 162.

Münster, E., Rüger, H., Ochsmann, E., Letzel, S., & Toschke, A. M. (2009). Over-indebtedness as a marker of socioeconomic status and its association with obesity: A cross-sectional study. *BMC Public Health*, *9*, 286.

Murtin, F., & d'Ercole, M. M. (2015). *Household wealth inequality across OECD countries: New OECD evidence*. 8.

OECD. (2013). *OECD framework for statistics on the distribution of household income, consumption and wealth*. Paris: OECD Publishing.

OECD. (2017). *How's life? 2017: measuring well-being.* Paris: OECD Publishing.

Olken, B. A. (2009). Corruption perceptions vs. Corruption reality. *Journal of Public Economics*, *93*, 950–964.

Osberg, L. (1998). *Economic Insecurity* (No. 88; p. 69). Sydney: Social Policy Research Centre, University of New South Wales.

Osberg, L. (2010). *Measuring Economic Insecurity and Vulnerability as part of Economic Well-being: Concepts and Context* (p. 43).

Osberg, L. (2018). Economic insecurity: Empirical findings. In C. D'Ambrosio (Ed.), *Handbook of Research on Economic and Social Well-Being.* Edward Elgar Publishing.

Osberg, L., & Sharpe, A. (2014). Measuring Economic Insecurity in Rich and Poor Nations. *Review of Income & Wealth*, *60*, S53–S76.

Oswald, A. J., & Wu, S. (2010). Objective Confirmation of Subjective Measures of Human Weil-Being: Evidence from the U.S.A. *Science*, *327*, 576–579. JSTOR.

Otterbach, S., & Sousa-Poza, A. (2016). Job insecurity, employability and health: An analysis for Germany across generations. *Applied Economics*, *48*, 1303–1316.

Pacifico, D., & Poege, F. (2017). Estimating measures of multidimensional poverty with Stata. *The Stata Journal*, *17*, 687–703.

Prieto, J. (2019). *Degrees of vulnerability to poverty: A low-income dynamic approach for Chile.* Presented at the Eighth Meeting of the Society for the Study of Economic Inequality, Paris.

Ravallion, M. (2011). On multidimensional indices of poverty. *The Journal of Economic Inequality*, *9*, 235–248.

Ravallion, M. (2012a). Mashup Indices of Development. *The World Bank Research Observer*, *27*, 1–32. JSTOR.

Ravallion, M. (2012b). Troubling tradeoffs in the Human Development Index. *Journal of Development Economics*, *99*, 201–209.

Rehm, P. (2016a). *Risk inequality and welfare states: Social policy preferences, development, and dynamics.* Cambridge University Press.

Rehm, P. (2016b). *Risk Inequality and Welfare States: Social Policy Preferences, Development, and Dynamics.* Cambridge University Press.

Rohde, N., & Tang, K. K. (2018). Economic insecurity: Theoretical approaches. In C. D'Ambrosio (Ed.), *Handbook of Research on Economic and Social Well-Being.* Edward Elgar Publishing.

Rohde, N., Tang, K. K., Osberg, L., & Rao, D. S. P. (2015). Economic Insecurity in Australia: Who is Feeling the Pinch and How? *Economic Record*, *91*, 1–15.

Rohde, N., Tang, K. K., Osberg, L., & Rao, D. S. P. (2017). Is it vulnerability or economic insecurity that matters for health? *Journal of Economic Behavior & Organization*, *134*, 307–319.

Rohde, N., Tang, K. K., Osberg, L., & Rao, P. (2016). The effect of economic insecurity on mental health: Recent evidence from Australian panel data. *Social Science & Medicine*, *151*, 250–258.

Rohde, N., Tang, K. K., & Rao, D. S. P. (2014). Distributional Characteristics of Income Insecurity in the U. S., Germany, and Britain. *Review of Income & Wealth*, *60*, S159–S176.

Rohde, N., Tang, K., & Osberg, L. (2017). The self-reinforcing dynamics of economic insecurity and obesity. *Applied Economics*, *49*, 1668–1678.

Romaguera de la Cruz, M. (2017). *Economic insecurity in Spain: A multidimensional analysis* (Working Paper No. 448). ECINEQ, Society for the Study of Economic Inequality.

Schicks, J. (2013). The Definition and Causes of Microfinance Over-Indebtedness: A Customer Protection Point of View. *Oxford Development Studies*, *41*, S95–S116.

Sehnbruch, K., Carranza, R., & Prieto, J. (2018). The Political Economy of Unemployment Insurance based on Individual Savings Accounts: Lessons from Chile. *Development and Change*, *0*. https://doi.org/10.1111/dech.12457

Sehnbruch, K., González, P., Apablaza, M., Méndez, R., & Arriagada, V. (2020). The Quality of Employment (QoE) in nine Latin American countries: A multidimensional perspective. *World Development*, *127*, 104738.

Selenko, E., & Batinic, B. (2011). Beyond debt. A moderator analysis of the relationship between perceived financial strain and mental health. *Social Science & Medicine*, *73*, 1725–1732.

Smith, T. G., Stoddard, C., & Barnes, M. G. (2009). Why the Poor Get Fat: Weight Gain and Economic Insecurity. *Forum for Health Economics & Policy*, *12*. https://doi.org/10.2202/1558-9544.1151

Stampini, M., Robles, M., Sáenz, M., Ibarrarán, P., & Medellín, N. (2016). Poverty, vulnerability, and the middle class in Latin America. *Latin American Economic Review*, *25*, 1–44.

Stiglitz, J. E., Fitoussi, J.-P., & Durand, M. (Eds.). (2018). *For Good Measure: Advancing Research on Well-being Metrics Beyond GDP*. Paris: OECD Publishing.

Stiglitz, J. E., Sen, A., & Fitoussi, J.-P. (2009). *Report by the commission on the measurement of economic performance and social progress*. Retrieved from http://ec.europa.eu/eurostat/documents/118025/118123/Fitoussi+Commission+report.

Sweet, E., Kuzawa, C. W., & McDade, T. W. (2018). Short-term lending: Payday loans as risk factors for anxiety, inflammation and poor health. *SSM - Population Health*, *5*, 114–121.

Sweet, E., Nandi, A., Adam, E. K., & McDade, T. W. (2013). The high price of debt: Household financial debt and its impact on mental and physical health. *Social Science & Medicine*, *91*, 94–100.

Thomson, S., Cylus, J., & Evetovits, T. (2019). *Can people afford to pay for health care? New evidence on financial protection in Europe*. Copenhagen: World Health Organization, Regional Office for Europe.

Tourangeau, R., Rips, L. J., & Rasinski, K. (2000). *The Psychology of Survey Response*. Cambridge University Press.

Tromben, V., & Podestá, A. (2019). *Las prestaciones familiares públicas en América Latina* (No. LC/TS.2018/97/Rev.1); p. 80). Santiago: CEPAL.

UNDP. (2018). *Human Development Indicators and Indices: 2018 Statistical Update Team*. New York: United Nations Development Programme (UNDP).

United Nations Development Programme. (1994). *Human Development Report 1994—New dimensions of human security*. New York: Oxford Press.

Wagstaff, A., Eozenou, P., & Smitz, M. (2020). Out-of-Pocket Expenditures on Health: A Global Stocktake. *The World Bank Research Observer*, *0*, 35.

Watson, B., & Osberg, L. (2018). Job insecurity and mental health in Canada. *Applied Economics*, *50*, 4137–4152.

Western, B., Bloome, D., Sosnaud, B., & Tach, L. (2012). Economic Insecurity and Social Stratification. *Annual Review of Sociology*, *38*, 341–359.

Western, B., Bloome, D., Sosnaud, B., & Tach, L. M. (2016). Trends in Income Insecurity Among U.S. Children, 1984-2010. *Demography*, *53*, 419–447.

Yeung, W. J., Linver, M. R., & Brooks–Gunn, J. (2002). How Money Matters for Young Children's Development: Parental Investment and Family Processes. *Child Development*, *73*, 1861–1879.

## 10. Appendices

Table A.1: Average marginal effects on the probability of a household facing a large drop in income or a sharp increase in its expenses for significant variables

| Variables | Pooled data: 2007-2011-2014-2017 | | |
|---|---|---|---|
| | AME | | Std. Dev. |
| *Household head characteristics* | | | |
| Female | 0.020 | ** | (0.008) |
| Age (years) | 0.005 | *** | (0.001) |
| Age² (years) | -0.001 | ** | (0.001) |
| Education: Ref. Secondary school | | | |
| Primary school | 0.021 | ** | (0.011) |
| University degree | 0.002 | | (0.013) |
| Labour status: Ref.  Unoccupied | | | |
| Formal employed | 0.004 | | (0.011) |
| Informal employed | 0.036 | *** | (0.012) |
| *Household characteristics* | | | |
| Household type: Ref. Couple without children | | | |
| Single without children | -0.033 | ** | (0.015) |
| Couple with children | 0.053 | *** | (0.015) |
| Single mother with children | -0.020 | | (0.015) |
| Pensioner couple | -0.024 | | (0.020) |
| Single pensioner | -0.069 | *** | (0.022) |
| Number of children < 15 | 0.026 | *** | (0.007) |
| Number of workers | 0.015 | *** | (0.005) |
| Housing: Ref. Own housing (no mortgage) | | | |
| Rent | 0.043 | *** | (0.009) |
| Own housing, mortgage | 0.025 | ** | (0.011) |
| Income: Ref. Decile 6-8 income group | | | |
| Decile 1-5 income group | 0.030 | *** | (0.010) |
| Decile 9-10 income group | -0.078 | *** | (0.010) |
| Year: Ref. 2017 | | | |
| 2007 | 0.026 | ** | (0.011) |
| 2011 | 0.002 | | (0.010) |
| 2014 | -0.085 | *** | (0.010) |

Source: Author's calculations based on the Chilean Survey of Household Finances (2007, 2011, 2014 and 2017).

Notes: I present average marginal effects for probit estimations in which the dependent variable is a large drop in household income or a sharp increase in its expenses.   *** significance at 1 percent; ** significance at 5 percent; * significance at 1 percent.

Table A.2: Correlation between economic insecurity indicators in Chile, 2007-2017

| Indicators | Per cent of households in row distributed in each indicator (%) | | | |
|---|---|---|---|---|
| | Unexpected economic shocks | Uninsured employment | Over-indebtedness | Asset poverty |
| Unexpected economic shocks | 1 | | | |
| Unprotected employment or non-workers | 0.047 | 1 | | |
| Over-indebtedness | 0.144 | -0.003 | 1 | |
| Asset poverty | 0.213 | 0.141 | 0.096 | 1 |

Source: Author's calculations based on the Chilean Survey of Household Finances (2007, 2011, 2014 and 2017).