SPECIAL ISSUE ARTICLE

WILEY

Poverty and vulnerability in Mozambique: An analysis of dynamics and correlates in light of the Covid-19 crisis using synthetic panels

Vincenzo Salvucci [ID] | Finn Tarp [ID]

University of Copenhagen, Copenhagen, Denmark

Correspondence
Vincenzo Salvucci, University of Copenhagen, Øster Farimagsgade 5, Building 26, DK-1353 Copenhagen K, Denmark.
Email: vincenzo.salvucci@econ.ku.dk

Abstract

This study aims at providing new insights into poverty, vulnerability, and their correlates in Mozambique, applying synthetic panels techniques and expanding on earlier analyses. Our results suggest that there is a high degree of poverty immobility, especially in rural areas in the northern and central regions and for low-educated people. Even nonpoor households are at a high risk to vulnerability, and this risk does not differ much for households in urban/rural areas or in different regions or with different education levels. We also observe that a large portion of the population remains in or out of poverty over the entire year, with a higher percentage of individuals moving into poverty between the dry and the rainy seasons and a nonnegligible proportion of vulnerable people not managing to revert to nonpoverty in the subsequent dry season. Overall, these findings are highly relevant for designing anti-poverty policies and strategies, as they provide information on intra-year shocks and on some of the characteristics related to upward and downward mobility over longer time spans, also with regard to the recent Covid-19 and other recent shocks suffered by the country.

KEYWORDS

Mozambique, poverty, poverty dynamics, synthetic panels, vulnerability

This paper has been submitted for the special issue: "Poverty, vulnerability and Covid-19."

- -

1 | INTRODUCTION

Longer-term poverty trends in Mozambique are well known thanks to a number of available household surveys and to several poverty assessments and studies undertaken since 1996/1997. The positive achievements over time in terms of growth and poverty reduction, together with concerns related to sluggish agricultural productivity, growing inequality, and regional disparities, are among the most important stylized facts uncovered by these analyses. Nevertheless, Mozambique remains one of the poorest countries in the world.

Five years ago, the positive developments registered seemed to pave the path for further growth and broad-based development, and findings of significant coal and natural gas reserves in the early 2010s increased these expectations even further. Nonetheless, from 2015 a series of economic and natural shocks hit the country, causing significant economic slowdowns and possibly strong impacts on living standards (Egger et al., 2020; Mahdi et al., 2018, 2019; Mambo et al., 2018; World Bank, 2020a). Finally, the Covid-19 crisis struck and remains ongoing (Barletta et al., 2021; Betho et al., 2021; DTM & INGC, 2020; FAO, 2020; Mussagy & Mosca, 2020).

In this situation, understanding who among the poor and vulnerable are likely to remain in their category over time or experience a downward/upward transition is key for timely policy responses. Such an analysis would greatly benefit from representative panel data following households over time, but panel data are not available.[1] While nationally representative cross-sectional household budget survey data exist, they are collected only every 5–6 years. Consequently, most poverty studies and evaluations in Mozambique lack the poverty and vulnerability dynamic dimension.[2]

This study attempts to provide new insights into poverty, vulnerability, and their correlates in Mozambique using all the information in the four national household budget surveys available and with regard to the Covid-19 crisis and other shocks suffered by the country in recent years. We first expand the analyses in Salvucci and Tarp (2021) that applied the synthetic panels approach introduced by Dang et al. (2014) and Dang and Lanjouw (2013, 2017, 2021) to the four national household budget surveys; and in this study, we obtain a more detailed profile of poverty and vulnerability transitions, adding insights to the dynamic dimension of these phenomena. Moreover, we analyze the panel dimension of the 2014/2015 household budget survey in detail compared to the last poverty assessment. It only presented poverty rates in the various quarters without exploring the different trajectories.

The new insights we provide include robust estimates of the transition probabilities between different poverty states in a period of sustained growth and moderate poverty reduction. They highlight the results relative to the probabilities of staying poor, becoming vulnerable or falling into poverty, for different household categories and characteristics over time. Also, we provide an analysis of intra-year mobility in a "normal" year such as 2014/2015. It permits analyzing, for example, the characteristics of those households that remain poor throughout the year or the characteristics of those who fall into poverty during the rainy season and do not manage to recover in the subsequent dry season, a key pattern in the Mozambican setting.

The period under analysis has been one of accelerated growth and poverty reduction for Mozambique, and our results depend on the specific subperiod under analysis. This means, for

example, that the profiles of poverty and vulnerability transitions we find refer to a relatively benign period and that this may have changed, especially after the Covid-19 shock struck. Section 2 presents the context; Section 3 describes the data, and Section 4 presents the methodology. Section 5 discusses the results 5 and Section 6 concludes.

2 | CONTEXT

In this section, we focus on the general economic context, main stylized facts concerning poverty, and existing literature with respect to poverty and vulnerability transitions at the national level. We also include considerations about Covid-19 and the other shocks during 2015–2021.

After emerging from a devastating and prolonged conflict during the 1980s and the early 1990s, Mozambique experienced sustained economic growth. Excluding a drop in 2000, when catastrophic flooding hit the country, the annual gross domestic product (GDP) per-capita growth rate was about 8% in 1996–2001, following the reconstruction of the country, and it stabilized around 4%–5% during 2002–2015 (World Bank, 2020b). This led Mozambique to having one of the best economic performances in the region (Figure 1).

With growth, poverty reduced as well in the period 1996/1997–2014/2015. The most recent poverty assessment, based on the 2014/2015 household budget survey, presented positive results in terms of poverty reduction and welfare improvements over this period. Headcount poverty rates decreased from about 70% in 1996/1997 to 53% in 2002/2003, to 52% in 2008/2009, and to 46% in 2014/2015, a notable gain in both regional and international comparative perspectives (see DEEF, 2016) (Figure 1).

DEEF (2016) also reports a significant increase in (consumption) inequality over the 1996/1997–2014/2015 period, with the trend accelerating dramatically in the most recent period: the Gini index increased from 0.42 in 2008/2009 to 0.47 in 2014/2015. The incidence of multidimensional poverty also followed a decreasing trend, notwithstanding variations by areas/province, with multidimensional poverty being significantly worse for the northern and central regions of the country and for rural areas (DEEF, 2016).

Starting from the second half of 2015, a significant economic slowdown occurred due to a sharp decrease in commodity prices, weakened international demand, a series of severe weather shocks, increasing violence against civilians in the northern region, and a debt scandal
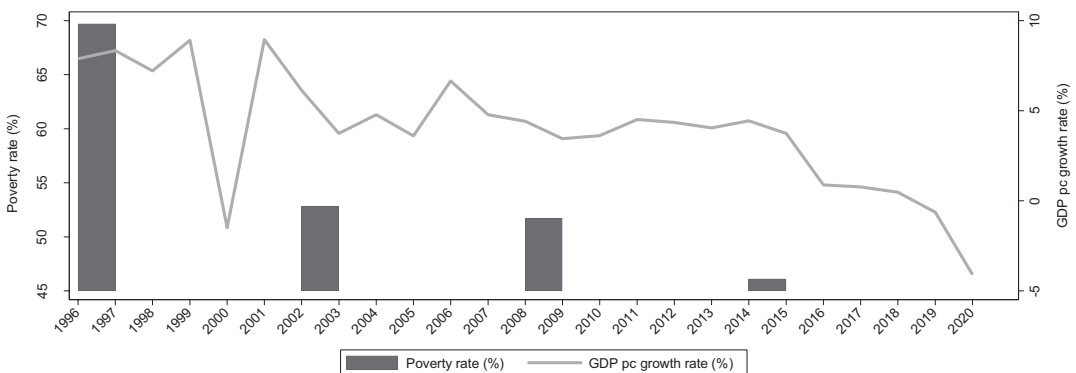

FIGURE 1 Mozambique GDP per-capita growth rate (%, right axis) and poverty rate (%, left axis), 1996–2020. *Source*: Authors' elaboration based on World Bank (2020b) and DEEF (2016)

(Mahdi et al., 2018, 2019; World Bank, 2020). The hidden debt scandal in 2015 brought the International Monetary Fund to suspend its support to the country and development partners to cut or withdraw foreign aid and direct state budget support; this led to a strong currency devaluation and created severe challenges for the management of public finances (Kroll Associates U.K. Limited, 2017; MNRC, 2017a, 2017b; Navarra & Udelsmann Rodrigues, 2018; World Bank, 2018). In 2019, two major cyclones hit the central region (cyclone Idai) and the northern province of Cabo Delgado (cyclone Kenneth), and the country still suffers from their consequences. In addition, Cabo Delgado experienced, from 2017, a situation of conflict, increasing violence against civilians, and internal displacement (BBC, 2021). All these factors contributed to a significant economic slowdown. Consequently, both consumption and multidimensional poverty appear to have stagnated or worsened.[3]

In this situation, Covid-19 struck. Starting in March 2020, the pandemics-related health and economic crisis hit Mozambique (DTM & INGC, 2020; FAO, 2020; Mussagy & Mosca, 2020). The total number of positive Covid-19 cases increased from 1,507 in July 2020 to about 11,000 in October 2020 (INS, 2020a, 2020b). The cases increased again in January 2021, when they reached about 1,275 cases a day, and by August 2021, the total number of positive Covid-19 cases was 126,390, more than 100,000 cases compared to the end of 2020, and cumulative deaths reached 1,500 units, about nine times as much compared to January 1, 2021 (WHO, 2021). The state of emergency announced on March 30, 2020, was extended (Deutsche Welle, 2020), and previously introduced restrictions and preventive measures were further tightened in 2021, including a night curfew, restrictions on public and private gatherings, and further restrictions on foreign arrivals (Club of Mozambique, 2021).

Given that recently collected household data are not available, the studies that attempted to assess the impact of the current Covid-19 crisis on poverty and other dimensions had to rely on ad hoc assumptions and simulation methods. For example, Mussagy and Mosca (2020) estimated that poverty may have increased to 75%–81% after the Covid-19 restrictive measures. More recently, Barletta et al. (2021) suggest that consumption may have decreased by between 7.1% and 14.4% and that poverty may have increased by between 4.3 and 9.9 percentage points in 2020, depending on the specification. FAO (2020) and UNICEF Mozambique (2020) also pointed to the potential impacts of the health crisis and related restriction measures on food security and livelihoods and on missed education opportunities for children due to school closures. Finally, both FAO (2020) and World Bank experts suggest that poor and vulnerable families, dependent on the informal sector, were harder hit than other households, mainly in urban and peri-urban areas (FAO, 2020; Saute et al., 2020). In addition, the Covid-19 crisis affected most of the countries, and this translated into lower demand for goods produced by the country and lower amounts of remittances received.

As regards poverty dynamics, Salvucci and Tarp (2021) provide a preliminary analysis of poverty dynamics in Mozambique using the synthetic panels approach by Dang et al. (2014) and Dang and Lanjouw (2013, 2017, 2021). They applied it to the 1996/1997, 2002/2003, 2008/2009, and 2014/2015 cross-sectional household budget surveys. Their national-level analysis finds that in most year-to-year comparisons there is a greater proportion of people getting out of poverty than falling into poverty, consistent with the poverty reduction process described. Studying the two most recent surveys, they also report that a sizable percentage of the population is poor in both years (37%) or is nonpoor in both years (39%). This comes alongside a higher probability of a person being poor in 2014/2015 given that he or she was poor in 2008/2009 than the probability of escaping poverty (69% versus. 31%). They also argue that there seems to exist greater mobility

between the poor and the vulnerable group compared to the more limited mobility between the former two groups and the middle class (Salvucci & Tarp, 2021).

In this study, we perform as well an analysis of the survey quarters of the 2014/2015 household budget survey to study intra-year poverty dynamics, extending the analysis presented in Salvucci and Tarp (2021). Regarding intra-year variations, DEEF (2016) states that poverty rates are sensibly higher in the months from mid-November 2014 to mid-February 2015. This is common for Mozambique, since these months represent the core of the rainy season for most areas and provinces, and they are often associated with scarce food reserves, high food prices, hunger, and higher poverty rates. Similar results are observed in previous poverty assessments (DNEAP, 2010; DNPO, 1998, 2004).

With respect to national-level poverty transitions, Salvucci and Tarp (2021) note that Mozambique is characterized by a very high degree of intra-year poverty immobility, with a large portion of the population remaining either in poverty or out of poverty over the whole period analyzed, with smaller percentages of individuals moving upward or downward. They find that the percentage of individuals moving into poverty is higher between the dry and the rainy seasons, whereas the percentage of individuals moving out of poverty is higher between the rainy and the subsequent dry seasons. They also observe that there is a nonnegligible proportion of households falling into poverty in "bad" quarters, while not recovering in subsequent "good" quarters.

All these results point to a situation of high levels of immobility. However, they do not provide any guidance on the characteristics of the households that are more likely to experience different transitions. This is key to assess the mobility and resilience of households, which is why this type of analysis is discussed in Section 5.

3 | DATA

We use data from all the nationally representative household budget surveys, including 1996/1997, 2002/2003, 2008/2009, and 2014/2015 (abbreviated as IAF96, IAF02, IOF08, and IOF14, respectively). The National Institute of Statistics (INE) implemented these surveys, whereas the Ministry of Economics and Finance with technical assistance from various partners, including the International Food Policy Research Institute (IFPRI), the United Nations University—World Institute for Development Economic Research, and the University of Copenhagen, performed the consumption and poverty analyses (DEEF, 2016; DNEAP, 2010; DNPO, 1998, 2004; INE, 2004, 2010, 2015).

In several respects, the various IAF/IOFs are very similar. Despite the existence of some differences in the structure of the questionnaires, the four surveys are comparable with regard to their main objective: measuring consumption poverty and other dimensions of well-being at a given point in time. They are representative of Mozambique as a whole, rural and urban areas, and each of the 11 provinces. In all surveys, data were collected over the period of 1 year.

The fact that all the IAF/IOFs are very similar in their scope and design is important. We can apply the synthetic panels method only if data are comparable: the underlying population must be the same in all rounds of the survey, which makes it possible to use time-invariant household characteristics to predict household consumption (see Dang et al., 2014). In the Mozambican case, the sampling methodology remained largely the same across different survey rounds, even though relatively minor changes occurred (INE, 2004, 2010, 2015).

The IOF14 is similar to previous IAF/IOFs in most aspects, though it includes a repeated interview (mini-panel) survey (DEEF, 2016; INE, 2015). The IOF14 was conducted from mid-August

2014 to mid-August 2015. The 12-month period was subdivided as follows: Q1, mid-August to mid-November 2014; Q2, mid-November 2014 to mid-February 2015; Q3, mid-February to mid-May 2015; and Q4, mid-May to mid-August 2015. Originally, the design was that each household was to be interviewed four times over the four quarters of the year. However, for various reasons Quarter 3 ended up not being implemented, but fieldwork was reinstated in the fourth quarter. Additional information is found in DNPO (1998, 2004), DNEAP (2010), DEEF (2016), and INE (2004, 2010, 2015).

4 | METHODOLOGY

The synthetic panels methodology introduced by Dang et al. (2014) and Dang and Lanjouw (2013, 2017, 2021) permits to construct synthetic panels data from repeated cross sections. It is based on an imputation procedure through which the values of the relevant welfare aggregate (income or consumption) for households observed at time 2, are estimated using households and community characteristics and welfare aggregates measured at time 1. We refer to the aforementioned authors for more details and formal presentation, as well as to Garcés-Urzainqui et al. (2022), while providing here only a summary focusing on the specifics of the application to Mozambique.

In sum, cross-sectional survey data do not provide information on household consumption for the same households over time. Yet, under a series of assumptions, it is possible to estimate the consumption that round 2 households would have had in round 1 specifying a consumption model for round 1 that is based only on time-invariant household characteristics (Dang et al., 2014). Therefore, round 1 consumption is first projected on time-invariant characteristics; subsequently, the ordinary least squares parameters estimated in this consumption model are applied to the same time-invariant household characteristics, using the information collected in round 2. Similarly, we can obtain an estimate of household consumption in round 1 for households interviewed in round 2.

In a previous study (Salvucci & Tarp, 2021), relatively conservative consumption model specifications were implemented, in which only strictly time-invariant variables were included, such as gender of the household head, age, and education level, adding as well rural and province dummies, and we rely here on that same model. The time-invariant variables to be included in the consumption model are selected mainly from the literature on synthetic panels and from specific country applications. In particular, we followed Dang and Dabalen (2017), which focuses on African countries, and Cruces et al. (2015), which instead applies synthetic panels to data for Chile, Nicaragua, and Peru. Moreover, following Dang et al. (2014), in what follows the sample is limited to households whose head is aged between 25 and 55 years. Summary statistics for the variables included in the consumption model and estimates from the consumption model are included in Tables A1 and A2 in the online appendix.

Dang et al. (2014) consider two approaches to estimate the bounds on mobility between different poverty states: a nonparametric approach, with no assumptions about the joint error distribution, and a parametric approach, where the joint error distribution is assumed to be bivariate normal. In the following text, we apply the nonparametric and the parametric approaches using all the available survey data. However, only the results from the parametric approach are presented and discussed.

The nonparametric approach requires a few assumptions to estimate poverty mobility, but it retrieves only the upper and lower bounds for poverty mobility and immobility. However, if

the analyst can use only a limited number of time-invariant characteristics in the consumption model, the bounds obtained can be rather wide. When they are too wide, they provide little information on the underlying poverty transitions and are of little practical use. If additional assumptions on the joint distribution of the error terms are introduced, then bounds can be sharpened, and it is even possible to obtain point estimates for poverty mobility. Therefore, an effective method to reduce the estimated bounds' interval is to apply a parametric approach in which we assume that the joint error distribution is bivariate normal, with ρ as the correlation coefficient between the error terms in rounds 1 and 2. In general, a lower value of ρ implies a higher probability of mobility between rounds 1 and 2. Dang and Lanjouw (2013, 2021) introduce a method to compute point estimates for ρ. Once ρ is estimated, the procedures to compute the point estimates for poverty mobility are also provided in Dang and Lanjouw (2013, 2017, 2021) and Garcés-Urzainqui et al. (2022).

It is important to highlight at this point that the procedures outlined in the aforementioned studies are not exempt from limitations and critiques. Fields and Viollaz (2013), while arguing that conditional probabilities are more relevant than unconditional probabilities when analyzing poverty dynamics (even though they are frequently omitted from reported results in country applications), also claim that the synthetic panels method estimates them less accurately. Herault and Jenkins (2019), using Australian and British data, note that changing the age range of the household head used to define samples can affect results. Moreover, using different definitions to compute point estimates for ρ also has implications for the estimated poverty transitions. Simultaneously, the results also appear to be sensitive to variations in the value of the poverty line adopted (Herault & Jenkins, 2019). We address some of these issues both in the "Results" section and in the online appendix.

In Salvucci and Tarp (2021) the parametric and nonparametric approaches were applied to the survey quarter data of the IOF14, which constitute a true panel, to validate the synthetic panels approach in that setting. The quarters of the IOF14 were treated as cross-sectional surveys, and the synthetic panels methodology was applied to them. Comparing the synthetic panels results with the "true" estimates obtained using the real panel data revealed that the synthetic panels performed well: the true poverty rate and poverty transition estimates were within the bounds obtained using the synthetic panels in the vast majority of cases. This gives us confidence to apply the synthetic panels approach to the other household budget surveys that do not have panel data.

We also perform a vulnerability transition analysis, as outlined in Dang and Lanjouw (2017). The first step is identifying a group of vulnerable individuals within the nonpoor group using a vulnerability line. Three groups emerge. First, the poor are defined as those individuals whose daily real consumption per capita lies below the poverty line. Second, the vulnerable are those individuals whose daily real consumption per capita lies between the poverty line and the vulnerability line. Third, the nonvulnerable (alternatively defined as "middle class," "secure," or "prosperous") include those individuals whose daily real consumption per capita lies above the vulnerability line. Dang and Lanjouw (2017) propose to derive the vulnerability line from a specified index of vulnerability, defined either as the probability of becoming poor at time 2 conditional on being in the middle class at time 1 or as the probability of becoming poor at time 2 conditional on being vulnerable at time 1. The former indicated as P^1 is defined as the "insecurity index." The latter indicated as P^2 is defined as the "vulnerability index."

Dang and Lanjouw (2017) and Dang and Dabalen (2017), among others, clarify that the vulnerability index can be derived in various ways, including budgetary planning, social welfare objectives, or relative concepts of well-being. For example, Dang and Dabalen (2017) suggest that if the available resources for social protection programs can permit to assist, for example,

only 20% of the vulnerable population, this proportion can be a good starting point to derive the vulnerability index. In the Mozambican case, clear guidance on these vulnerability-related targets does not exist. Thus, we rely on the vulnerability line developed in Salvucci and Tarp (2021). This general analysis could then be tailored to the objectives of national policy-makers once they become available and/or official. As for the poor/nonpoor case, we relate vulnerability with key household and regional characteristics expected to be relevant when facing economic crises and shocks. The vulnerability line was obtained setting the vulnerability index, P^2, at 25, meaning that the vulnerability line was derived after setting the probability of becoming poor at time 2 conditional on being vulnerable at time 1 at 25%. This value is higher than the one applied in other contexts but falls in the range [10, 33], considered as suitable for several African countries in Dang and Dabalen (2017).

The second part of the "Results" section studies the panel dimension of the 2014/2015 household budget survey in greater detail compared to the most recent poverty assessment, providing an analysis of intra-year mobility in 2014/2015 and a more comprehensive profile of poverty transitions. As this is a true panel, the intra-year transitions analyzed are real transitions, not estimated based on a consumption model and not dependent on estimated parameters for the correlation coefficient between the error terms in rounds 1 and 2 (ρ).

5 | RESULTS

In this section, we present the estimates of poverty and vulnerability transitions over time for different household characteristics, used as independent variables in consumption models and expected to be associated with immobility or with upward/downward mobility: urban/rural areas, regions and provinces, household head gender, and education level. For each household characteristic, we highlight the most relevant results in terms of poverty and vulnerability dynamics across different time frames.

5.1 | Poverty and vulnerability transitions for different household characteristics, 1996/1997–2014/2015

In this section, we make use of all the available surveys, from 1996/1997 to 2014/2015, with a particular focus on the period 2008/2009 to 2014/2015. When considering the entire time frame, we limit the discussion to poverty dynamics, while we expand to both poverty and vulnerability when focusing on the period 2008/2009–2014/2015.

The poverty dynamics results obtained using the nonparametric approach are not shown, whereas the results from the parametric approach are presented for a subset of all possible year transitions and for different household and geographic characteristics,[4] making it possible to derive a profile of poverty mobility and immobility and bringing out how probabilities change when comparing different years.

As for the vulnerability analysis for the period 2008/2009–2014/2015, we use a value for the vulnerability index, P^2, of 25, as found in Salvucci and Tarp (2021). This entails that we derive the vulnerability line after setting the probability of becoming poor in 2014/2015 conditional on being vulnerable in 2008/2009 equal to 25%. As explained, this value is quite high, compared to other contexts, but it seemed reasonable for the Mozambican case.[5] This entails setting the

vulnerability line at a value of 75.3 Meticais,[6] which in turn corresponds to a scaling up of the original poverty line by about 158% and to considering about 40% of the population as "vulnerable."[7]

5.1.1 | National level

Figure 2 shows that the proportion of households that were poor in both years is between 30% and 40% for all transitions.[8] Nonetheless, these unconditional probabilities conceal the fact that the conditional probability to remain poor at time 2 if the individual was poor at time 1 increases steadily from about 55% for the transition 1996/1997 to 2002/2003 to about 70% for 2008/2009–2014/2015 (Figure 3). These findings point to a worrisome situation of very high levels of poverty immobility at the national level over the decades analyzed. Poverty immobility seems more likely for Mozambique than it is for Bosnia-Herzegovina, Lao PDR, Peru, the United States, Vietnam, and Chile (Cruces et al., 2015; Dang & Lanjouw, 2013). With respect to Latin America, only the estimates for Nicaragua seem to be comparable to those for Mozambique (Cruces et al., 2015); and when compared with other countries in Africa, chronic poverty is much more likely for Mozambique than for most other countries (Dang & Dabalen, 2017).[9]

These high and possibly increasing levels of immobility should not come as a surprise given the discussion in the context section: we showed in Figure 1 that GDP per-capita growth decreased over time and it gravitated around 0% from 2016 while inequality increased (DEEF, 2016). In this situation, poverty reduction has been rather weak. Given the lack of dynamism of the economy, the most likely outcome would be a high level of poverty immobility.

For the years 2008/2009–2014/2015, we also find that the conditional probabilities of remaining either vulnerable or middle class (states "vulnerable to vulnerable" and "middle class to middle class") are lower than the conditional probability for the state "poor to poor" (Figure 6b). Moreover, we observe that the most likely downward transition is from middle class to vulnerability (about 40%) (Figure 7b).[10] This certainly reflects the relatively high probability for even the better-off households of becoming vulnerable. Yet it also depends on the choice of the vulnerability line. In general, if we increase the vulnerability index, the proportion of the population living between the poverty line and the vulnerability line becomes smaller. Results obtained using different values for the vulnerability index and, in turn, for the vulnerability line are presented in the online appendix.

Regarding upward transitions from 2008/2009 to 2014/2015, Figure 8b reveals that the most likely upward transition is "poor 08/09 to vulnerable 14/15" (about 30%), whereas the transition "vulnerable 08/09 to middle class 14/15" is about half as likely, and the transition "poor 08/09 to
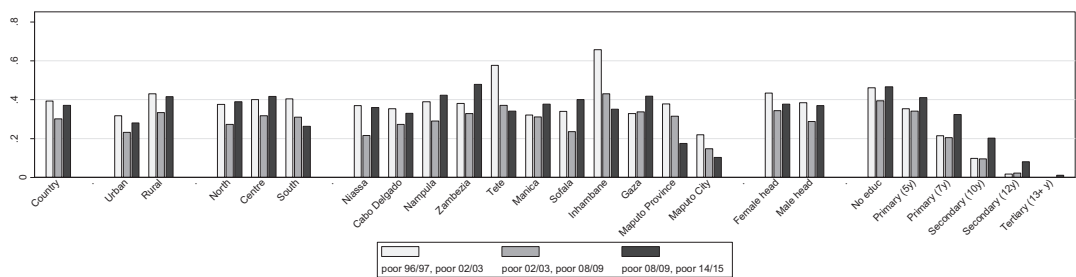

FIGURE 2 Unconditional probabilities of the state "poor, poor" and household/location characteristics, 1996/1997–2002/2003–2008/2009–2014/2015. *Source*: Authors' calculations
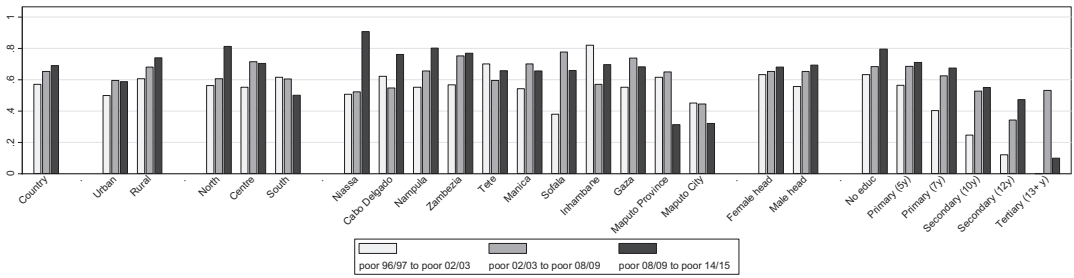
FIGURE 3 Conditional probabilities of the state "poor to poor" and household/location characteristics, 1996/1997–2002/2003–2008/2009–2014/2015. *Source*:Authors' calculations

middle class 14/15" is extremely unlikely. This is consistent with the poverty rate reduction observed between the 2 years, but it also highlights the difficulty of emerging from a state of poverty or vulnerability in the Mozambican setting.

5.1.2 | Geographic differences: Urban/rural, regional, and provincial differences

We find that rural households are consistently more likely than urban households to be poor in both periods for all the years, with a difference of about 10 percentage points (Figure 2). This confirms the concerns related to sluggish agricultural productivity and growing regional disparities (DEEF, 2016). Simultaneously, rural households are more likely to fall into poverty given that they were nonpoor at time 1, across all years. Yet both this probability and the difference with urban areas seem to have decreased over time (Figure 5), which points to a positive development with respect to the urban–rural gap.

When conditional probabilities of poverty immobility are considered, households residing in the northern provinces (especially Niassa) and in Zambezia are the ones having the highest probabilities of being poor in 2014/2015 if they were poor in 2008/2009; they are followed by the southern provinces of Inhambane and Gaza and by the remaining central provinces, while Maputo City and Maputo Province confirm the trend discussed earlier (Figure 6b).

Interestingly, the probability of being in the vulnerable group in 2014/2015 if the individual was vulnerable in 2008/2009 is not very different for households in urban or rural areas or for those living in different regions, and differences among provinces are not very wide (Figure 6b).[11]
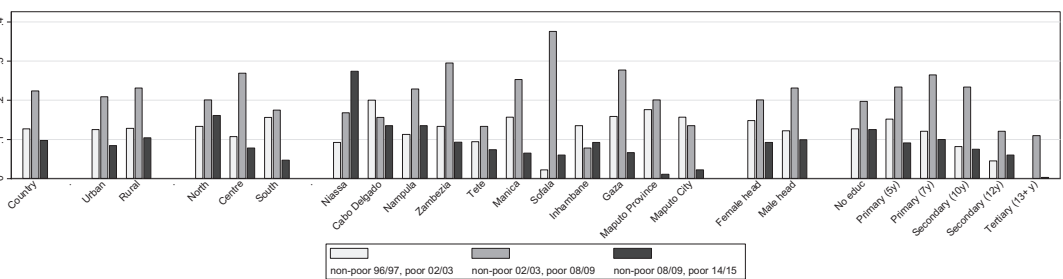

FIGURE 4 Unconditional probabilities of the state "nonpoor, poor" and household/location characteristics, 1996/1997–2002/2003–2008/2009–2014/2015. *Source*: Authors' calculations

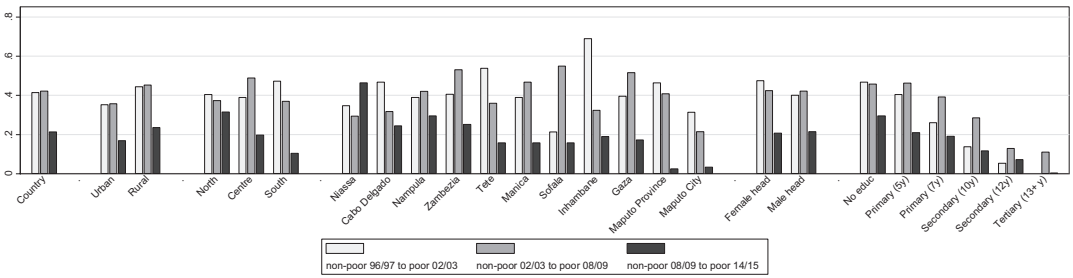**FIGURE 5** Conditional probabilities of the state "nonpoor to poor" and household/location characteristics, 1996/1997–2002/2003–2008/2009–2014/2015. *Source*: Authors' calculations
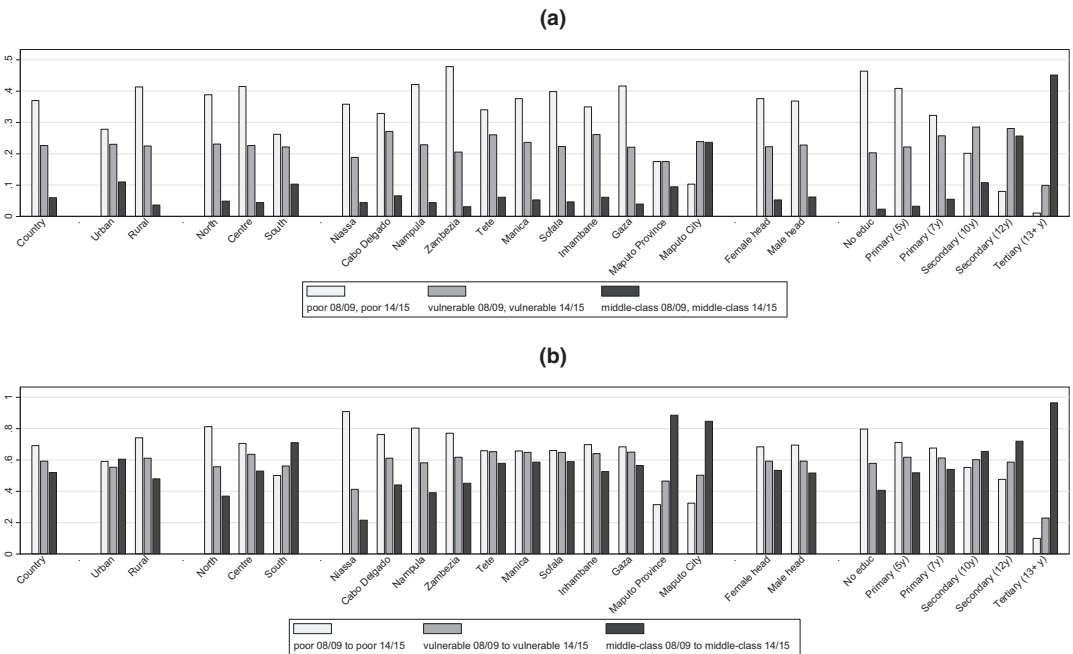

FIGURE 6 (a) Unconditional probabilities of the states "poor, poor," "vulnerable, vulnerable," and "middle class, middle-class" and (b) conditional probabilities of the states "poor to poor," "vulnerable to vulnerable," and "middle class to middle class" and household/location characteristics, 2008/2009–2014/2015. *Source*: Authors' calculations

Figures 4, 5, 7, and 8 highlight an emerging trend: if comparisons between older surveys do not reveal a clear geographic pattern, it is evident that a north–south gradient has progressively emerged as a powerful driver for downward and upward transitions. In all comparisons involving the recent 2014/2015 household survey, we find that the probability of exiting (entering) poverty at time 2 given that the individual was poor (nonpoor) at time 1 is—in almost all cases—higher (lower) the closer one gets to the south and to the capital Maputo (Figures 4 and 5). This is also true for downward transitions from vulnerability or middle class (Figures 7 and 8).
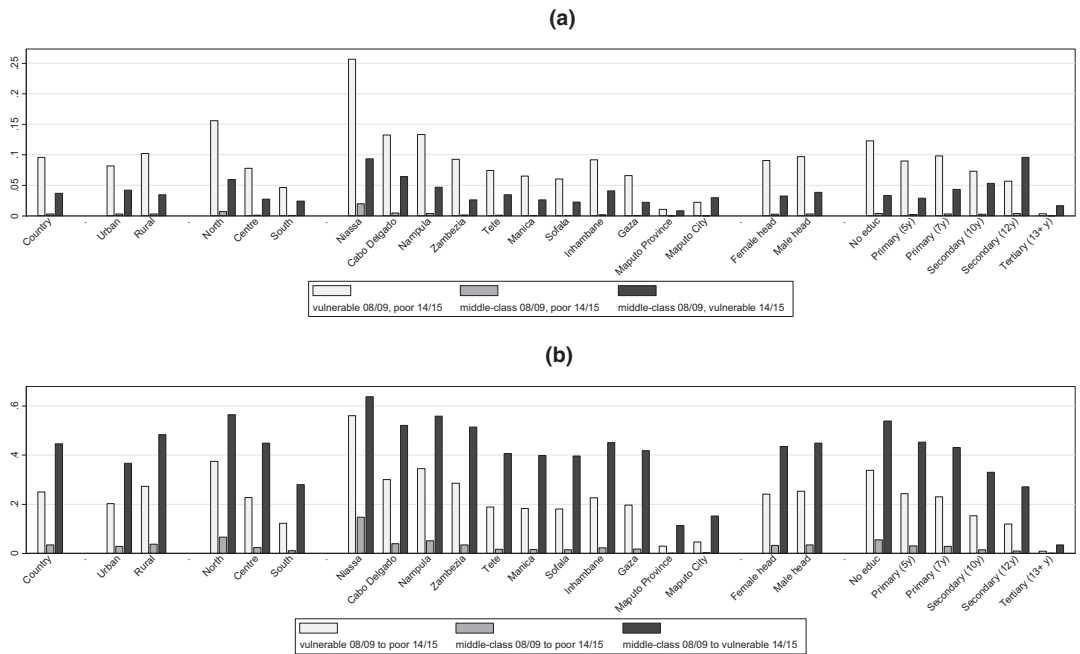
(a)

(b)

FIGURE 7 (a) Unconditional probabilities of the states "vulnerable, poor," "middle class, poor," and "middle class, vulnerable" and (b) conditional probabilities of the states "vulnerable to poor," "middle class to poor," and "middle class to vulnerable" and household/location characteristics, 2008/2009–2014/2015. *Source*: Authors' calculations

5.1.3 | Household head characteristics: Gender and education

With respect to gender of the household head, most year-to-year comparisons show that female-headed households have a slightly higher probability of being poor in both periods, with a difference of about 3–5 percentage points. The comparison between 2008/2009 and 2014/2015, however, yields no difference in the probability of being poor in both periods (Figures 2 and 3). The three-group analysis confirms this for the years 2008/2009–2014/2015 and for upward and downward transitions. The probability of being poor, vulnerable, or middle class both in 2008/2009 and in 2014/2015 does not seem to vary depending on the gender of the household head; also, upward and downward transition probabilities are largely comparable (Figures 6–8).

Instead, the analysis of all the transitions shows clearly that education is highly correlated with lower poverty immobility and with higher (lower) probabilities of upward (downward) transitions. For households with household heads with no education, the probability of being poor at time 2 given that the individual was also poor at time 1 is above 60% in all comparisons, and it is as high as 80% when 2008/2009 and 2014/2015 are compared (Figure 3). Consistently, the probability of being middle class in both times steadily increases with the education level of the household head (Figure 6). Only the probability of being vulnerable in both periods does not seem to show a clear pattern. It is markedly lower only in the relatively less common case of household head with tertiary education (Figure 6).

We also observe that the probability of entering poverty at time 2 given that the individual was nonpoor at time 1 steadily decreases with the level of education of the household head, for
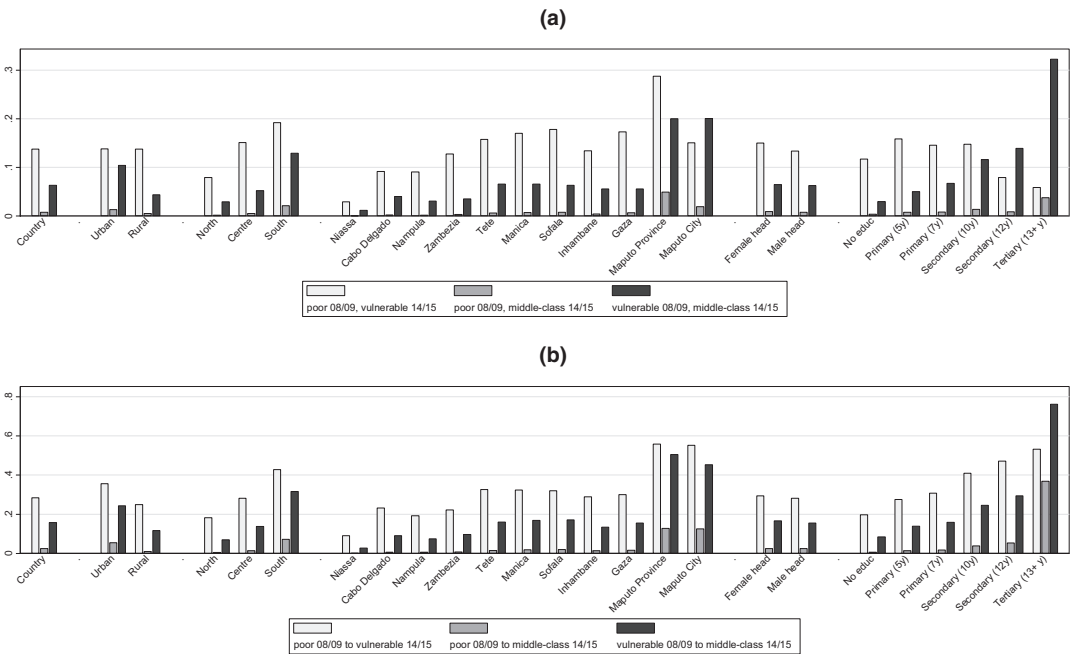
(a)

(b)

FIGURE 8 (a) Unconditional probabilities of the states "poor, vulnerable," "poor, middle class," and "vulnerable, middle class" and (b) conditional probabilities of the states "poor to vulnerable," "poor to middle class," and "vulnerable to middle class" and household/location characteristics, 2008/2009–2014/2015. *Source*: Authors' calculations

all possible year-to-year comparisons (Figure 5). The same applies for the probability of entering poverty in 2014/2015 if the individual was vulnerable in 2008/2009 and for the probability to fall into vulnerability in 2014/2015 if the individual was middle class in 2008/2009 (Figure 7). This consistent and pronounced pattern confirms that the level of education of the household head plays a central role in shaping poverty and vulnerability dynamics.

Overall, most of the earlier findings point to a situation of broad poverty immobility and of widespread risk of falling into poverty for many households. Consequently, the high levels of poverty and the persistence of poverty in most areas of the country make a major shock like the Covid-19 most worrisome. Upward mobility, which is not very likely for the majority of Mozambicans even in normal times (i.e., between survey years in which GDP growth rates averaged 7.5%), is expected to become even less likely after years of economic crisis and with a major economic and health shock like the ongoing Covid-19. Additional household categories may have observed their respective probabilities of becoming either vulnerable or poor increasing due to the Covid-19 shock. Even though it is difficult to provide at this stage a rigorous estimate of these changes, some of the existing estimates suggest that the Covid-19 shock may have affected relatively more urban households and households working outside agriculture, mainly in the informal or in the tourism sector, or residing in areas with higher levels of Covid-19 cases (Barletta et al., 2021; Betho et al., 2021; FAO, 2020; Mussagy & Mosca, 2020; Saute et al., 2020). Nonetheless, the indications provided here may be relevant for public policy with regard to both when the situation becomes more "normal" and considering that nothing indicates that those households and individuals, who were already poor or more prone to fall into poverty and vulnerability in the high-growth times, have become better off during the Covid-19 crisis.

5.2 | Intra-year poverty dynamics for different household characteristics, 2014/2015

We now turn to the analysis of intra-year poverty dynamics, based on the survey quarters of the 2014/2015 survey. It is useful at this point to remind that this is a mini-panel, so we report here the true transition rates observed across the three available survey quarters (Q1, Q2, and Q4). Results for poverty transitions at the national level had already been covered in Salvucci and Tarp (2021). Here, we add a profile of poverty mobility and immobility, relating them with the set of household and geographic characteristics introduced earlier and with an additional set of characteristics of interest (household head employment characteristics; possession of durable goods; access to electricity and to information means like computer, radio, or telephone)[12] (Figures 9–13). Relating poverty dynamics with this set of characteristics, we aim at providing guidance on who is likely to be highly affected by intra-year downturns and shocks. We anticipate that most of the patterns described in the following text are qualitatively similar to those associated with transitions over time; this increases our confidence with respect to the results estimated using the synthetic panels methodology.

5.2.1 | National level

Regarding poverty immobility between quarters, Figure 9b shows that the probability of being poor in Q2, given that the individual was also poor in Q1, is higher compared to the other transitions. This reflects the fact that the transition between the first two quarters, marked by the
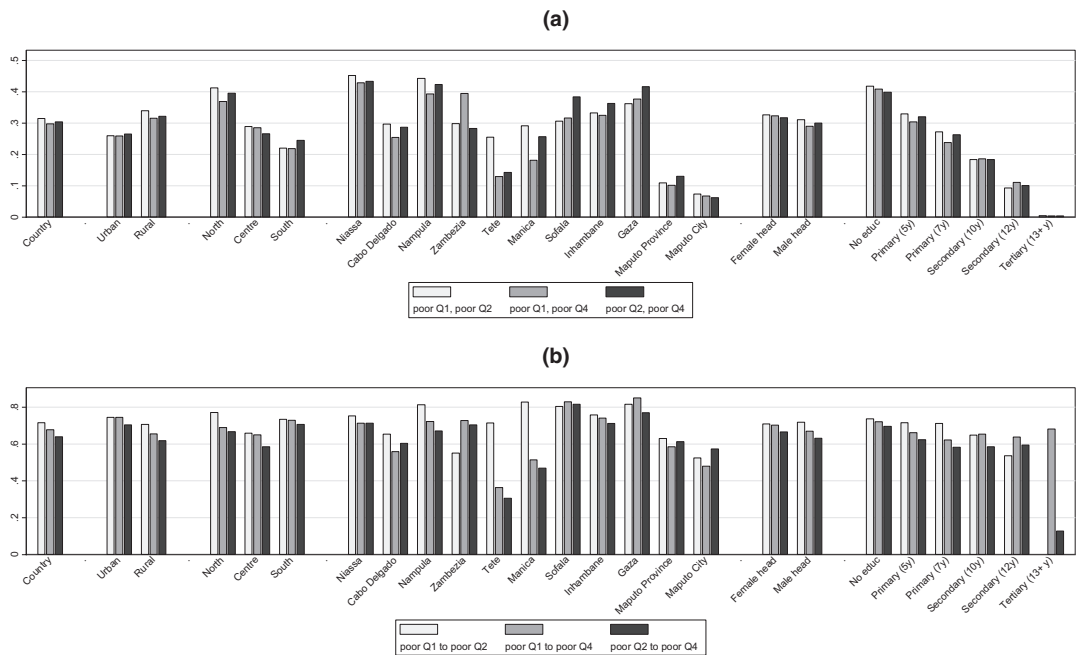

FIGURE 9 (a) Unconditional probabilities of the state "poor, poor" and (b) conditional probabilities of the state "poor to poor" for the transitions Q1–Q2, Q1–Q4, and Q2–Q4, and household/location characteristics, 2014/2015. *Source*: Authors' calculations
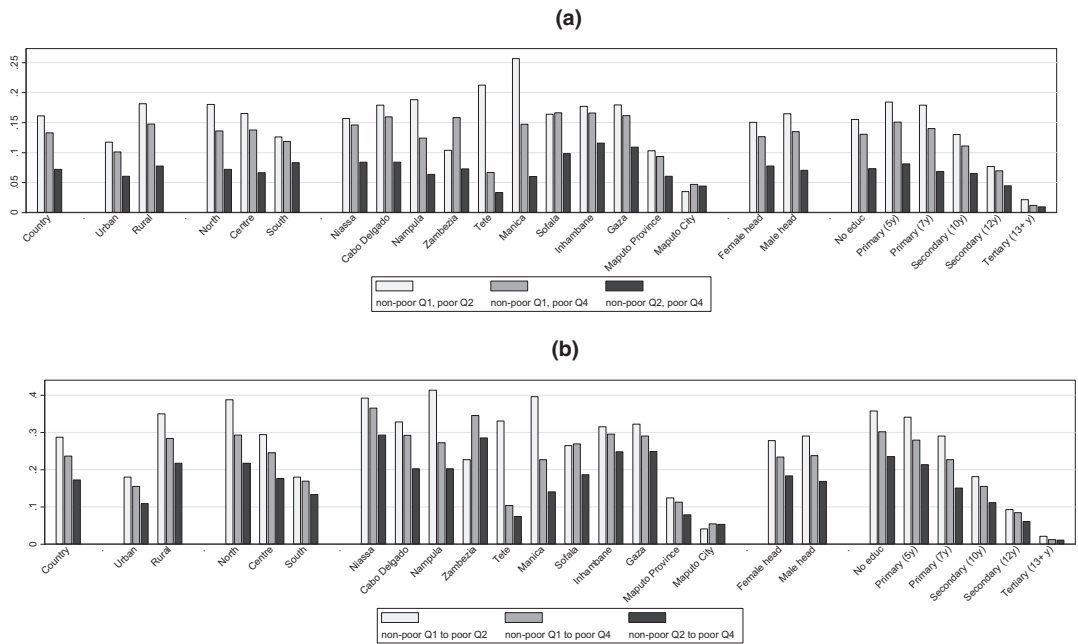
(a)

(b)

FIGURE 10 (a) Unconditional probabilities of the state "non-poor, poor" and (b) conditional probabilities of the state "nonpoor to poor" for the transitions Q1–Q2, Q1–Q4, and Q2–Q4, and household/location characteristics, 2014/2015. *Source*: Authors' calculations

rainy season, presents more challenges for Mozambican households. This pattern is confirmed in Figures 10 and 11 regarding upward and downward transitions. The probabilities of becoming poor are much higher for the transition between Q1 and Q2, about double the value of the transition from Q2 to Q4 (Figure 10b). The reverse is true for upward transitions, when the probabilities are much higher for the period Q2–Q4 (Figure 11b).

Figure 13 sheds light on the dynamic by which some households fall into poverty in the rainy season (Q2) and then do not manage to emerge from poverty in the subsequent dry season. While we consider the specific characteristics of these households in the following sections, here we highlight that the probability of remaining poor in Q4 given that the individual was nonpoor in Q1 and poor in Q2 is relatively high, at about 45%. The households experiencing this pattern deserve particular attention, as they present peculiar vulnerabilities that can turn a seasonal fluctuation across the poverty line into a more permanent state of poverty.

5.2.2 | Geographic differences: Urban/rural, regional, and provincial differences

Households in rural areas are more likely to be poor in both periods (about 35% versus. 25% in urban areas) (Figure 9a). Larger differences among the transitions between different quarters emerge when the conditional probabilities of entering poverty at time 2 if the individual was nonpoor at time 1 are analyzed (state "nonpoor to poor" in Figure 10b). Even though the pattern across household and location categories is similar, when the transition Q1–Q2 is considered, the probabilities of entering poverty seem to be much higher than those of the remaining transitions. In particular, the probabilities estimated for the state "nonpoor to poor" for the transition Q2–Q4
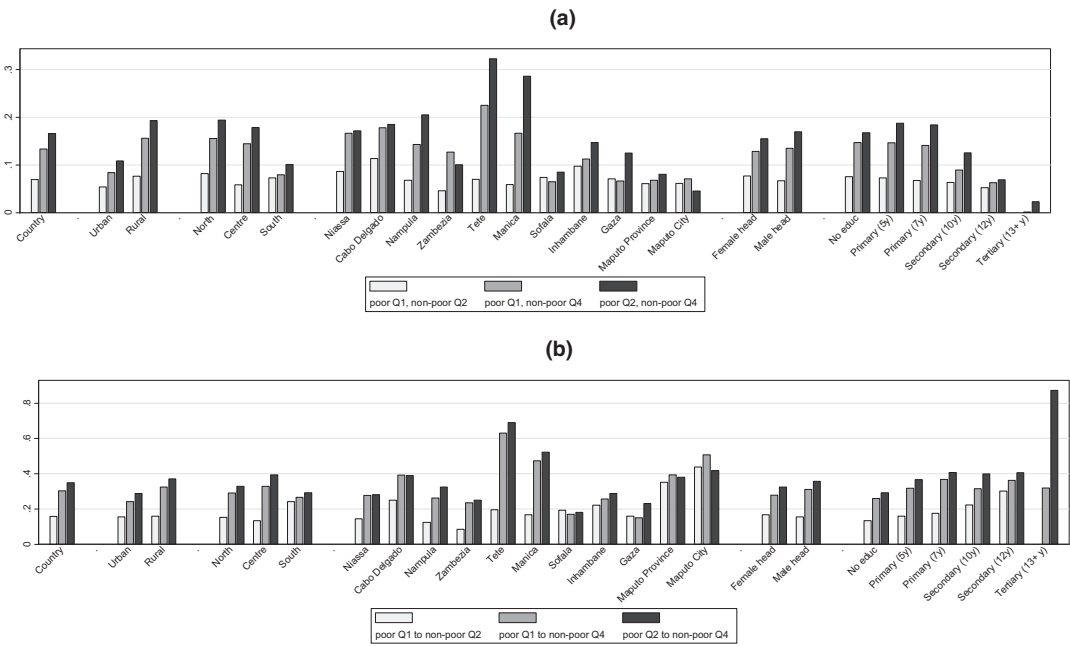
FIGURE 11 (a) Unconditional probabilities of the state "poor, nonpoor" and (b) conditional probabilities of the state "poor to nonpoor" for the transitions Q1–Q2, Q1–Q4, and Q2–Q4, and household/location characteristics, 2014/2015. *Source*. Authors' calculations
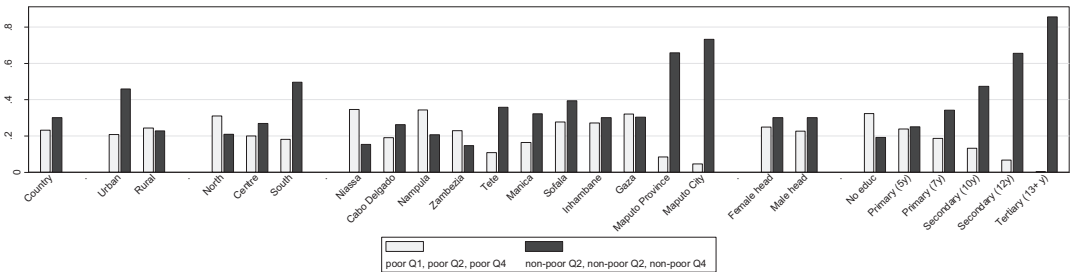

FIGURE 12 Unconditional probabilities of the states "poor Q1, poor Q2, poor Q4" and "nonpoor Q1, nonpoor Q2, non-poor Q4," and household/location characteristics, 2014/2015. *Source*: Authors' calculations

are about 5–15 percentage points lower than those for the transition Q1–Q2. This confirms that while entering poverty in the rainy season is more likely for all household categories, it is especially so for rural households (about 35% versus. 18% for urban households).

The states "poor, poor" across all the transitions (Q1–Q2, Q1–Q4, and Q2–Q4) are also more likely for households in the northern and central regions and for the southern provinces of Inhambane and Gaza (Figure 9a). Furthermore, the conditional probability of the state "nonpoor to poor" for the transition Q1–Q2 is also higher for households from the northern and central regions (about 40% and 30%, respectively, versus. 20% in the southern region) and for Inhambane and Gaza (Figure 10b).

When considering transitions across the entire year, the most common trajectories are those in which individuals are either poor or nonpoor over the whole year.[13] The proportion of
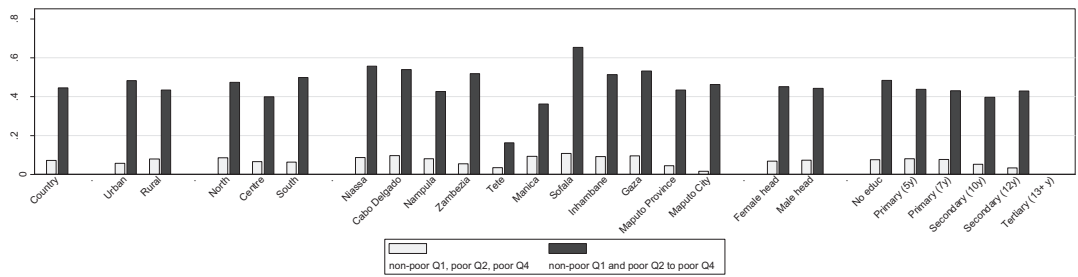
FIGURE 13 Unconditional probabilities of the state "nonpoor in Q1, poor in Q2, poor in Q4" and conditional probability of the state "nonpoor in Q1 and poor in Q2 to poor in Q4," and household/location characteristics, 2014/2015. *Source*: Authors' calculations

households that are poor in Q1, Q2, and Q4 is close to 25% at the national level, but it is about 35% for Niassa, Nampula, and Gaza (Figure 12). Conversely, the proportion of households that are nonpoor in Q1, Q2, and Q4 is about 30% at the national level, but it is much higher for urban areas (about 45%), for households in the south (about 50%), and for Maputo Province and Maputo City (nearly 70%).

Figure 13 shows that it is slightly more likely for urban than for rural households to remain poor in Q4 if they were nonpoor in Q1 and became poor in Q2. Moreover, the north–south gradient is absent from this picture, and the probabilities across provinces differ from the patterns discussed earlier. This is informative with regard to the characteristics of households that shift from a situation of nonpoverty in the dry season into one of poverty in the rainy season and then do not manage to revert to a situation of nonpoverty in the subsequent dry season.

5.2.3 | Household head characteristics: Gender and education

The proportion of people who are either poor or nonpoor across different quarters varies slightly depending on the household head's gender. Instead, the results relative to the level of education of the household head confirm the trend discussed in previous sections, with the proportion of households considered poor in each set of quarters decreasing with higher education levels of the household head (Figures 9a and 12). As for downward transitions between quarters, entering poverty in the rainy season is more likely for all household categories, but especially so for household heads with no or little education (Figure 10).

With respect to the probability of remaining poor in Q4 given that the individual was nonpoor in Q1 and became poor in Q2, we notice that, excluding those households whose heads have attained some tertiary education, it is only slightly lower for higher-education levels than it is for no education or incomplete primary education (Figure 13).

5.2.4 | Other household characteristics: Employment, possession of durable goods, and access to services

Concerning this last set of household characteristics, it may be important to draw a more detailed profile of poverty mobility and immobility. The results with respect to intra-year poverty transitions associated with these characteristics are described here and shown in Figures A5–A9

in the online appendix. Consistent with expectations, we find higher proportions of individuals who are poor in all intra-year survey quarter comparisons among households with household heads working in subsistence agriculture and for households without access to basic services, without good housing conditions, and not owning basic durable goods. The difference between households with and without a certain characteristic in some cases exceeds 20 percentage points (Figure A5, panel a).

Regarding downward transitions, the probabilities estimated for the state "nonpoor to poor" for the transition Q2–Q4 are sensibly lower than those for the transition Q1–Q2 also for households with heads who cannot read and write and heads who work in agriculture and for households without good quality roof, for households without electricity and access to information means, and for households not owning most common durable goods (Figure A6). The opposite is true for the probability of exiting poverty at time 2 if the individual was poor at time 1 (Figure A7).

The proportion of households that are poor in Q1, Q2, and Q4 is close to 35% for households in which at least one child in his or her school age is not attending school and for households without access to information means or to most common durable goods. Conversely, the proportion of households that are nonpoor in Q1, Q2, and Q4 is about 30–40 percentage points higher for households who have a good-quality roof, quality sanitation, and access to electricity and own most common durable goods compared to those who do not have access to these goods and services (Figure A8).

With respect to the probability of remaining poor in Q4 given that the individual was nonpoor in Q1 and became poor in Q2, we find some differences with previously outlined trends. This probability seems to be higher for households whose head works in small-trade activities than it is for other occupations, including smallholders working in agriculture (about 50% versus. 44%). Finally, remaining poor in Q4 if the individual was nonpoor in Q1 and becoming poor in Q2 is slightly more likely for households with access to safe water, quality sanitation, and most common durable goods than it is for households without access to these services and goods (Figure A9).

Overall, the analysis of this particular pattern provides a different transition profile. It may be associated to the vulnerability of particular household categories that are on average more exposed to the risk of falling into poverty if something goes wrong after the rainy season—which is generally bad in terms of poverty and vulnerability. There is the possibility that this result might be associated with the Covid-19 shock. Therefore, this shock seems to have affected urban areas and households relying on small trade and other informal activities for their living relatively more. In the analysis of the transition "nonpoor in Q1 and poor in Q2 to poor in Q4," we found that households not considered among the poorest in the country and which own some durable goods or have access to some basic services appear, nonetheless, to be highly vulnerable to either unexpected or slightly bigger-than-usual shocks. This is so especially after having fallen into poverty during intra-year downturns like the rainy season. If we then consider that the Covid-19 shock struck at the end of the difficult 2019/2020 rainy season,[14] we could expect that the poverty/vulnerability patterns based on the 2014/2015 data may have sensibly worsened during recent months.

6 | CONCLUSIONS

In this study, we provided new insights into poverty, vulnerability, and their correlates analyzing poverty and vulnerability dynamics, including an updated and more detailed profile of the household and individual characteristics associated with different poverty and vulnerability

transitions. Moreover, we analyzed the panel dimension of the 2014/2015 household budget survey, presenting also in this case a profile of some of the household and individual characteristics associated with different poverty and vulnerability intra-year transitions.

We make two main contributions. The first is robust estimates of the transition probabilities between different poverty states in a period of sustained growth and moderate poverty reduction, and we highlight the results relative to the probabilities of staying poor and becoming vulnerable or falling into poverty, for different household categories and characteristics over time. Second, we developed an analysis of intra-year mobility in a "normal" year (2014/2015), which permitted analyzing the characteristics of those households that remain poor throughout the year or that present a higher risk of falling into poverty during the rainy season and of not managing to recover in the subsequent dry season.

Our results suggest that there is a high degree of poverty immobility, especially in rural areas and in the northern and central regions. The risks of being stuck in poverty are lower the higher the education level, and education also appears to be associated with higher probabilities of moving from the poor to the vulnerable group and from the vulnerable to the nonvulnerable group. In addition, upward mobility seems more likely for individuals living in urban areas and in Maputo Province and Maputo City. The probability of a downward transition from vulnerability to poverty is particularly high for rural areas and for the provinces of Niassa, Cabo Delgado, Nampula, and Zambezia. Focusing on the most recent surveys, we find that even for households that are not in poverty, there is a relatively high risk of remaining in the vulnerable group. Furthermore, the probability of being in the vulnerable group is not very different for households in urban/rural areas, in different regions, or with different housing conditions and occupations.

Based on existing reports and studies, we also suggest that following the Covid-19 shock, the number of households in the vulnerable group—and in the poor group as well—has increased, possibly including household categories previously observed as generally less vulnerable, such as urban households and individuals working in the informal or in the tourism sector.

Concerning the intra-year poverty dynamics in 2014/2015, we found that a big share of the population was either in poverty or out of poverty over the entire year. We highlighted that there is a higher percentage of individuals moving into poverty between the dry and the rainy seasons and that a nonnegligible proportion of vulnerable people do not manage to revert to nonpoverty in the subsequent dry season.

Turning to the characteristics of the individuals who are nonpoor in the dry season, are poor in the rainy season, and do not manage to escape poverty in the subsequent dry season, we found that the characteristics associated with this pattern provide a peculiar transition profile. This is likely associated with the vulnerability of specific household categories that are not among the chronic poor but which seem to be more exposed to the risk of falling into poverty if something goes wrong after the rainy season, which is generally worse in terms of poverty and vulnerability in the Mozambican setting. If we add that the Covid-19 shock struck at the end of a difficult rainy season, this is likely to have amplified the already-negative poverty/vulnerability patterns outlined based on the 2014/2015 data.

We could not have obtained these estimates and results based on classic cross-sectional data analysis. The characteristics associated with poverty immobility, with downward mobility, or with the inability to recover from an adverse rainy season do not always coincide with the standard drivers of poverty in Mozambique,[15] and even when they overlap, the effect seems to be different depending on the type of transition.

Clearly, there are caveats regarding the chosen approach, and we do not have at this point data collected immediately before and after the Covid-19 shock or any other of the shocks suffered

after 2015. This implies that the drivers of poverty and vulnerability could have changed in recent years, in particular after the Covid-19 shock. Nevertheless, based on our clear understanding of the existing poverty reports, we believe that the structural drivers of poverty, vulnerability, and transition between different poverty states might not have changed drastically. Most important factors are highlighted in all the assessments, and this is so notwithstanding the numerous and sometimes major shocks suffered by the country during the 18 years between 1996/1997 and 2014/2015. Instead, additional drivers of vulnerability have emerged due to Covid-19, not substituting for standard drivers. Also and important, nothing indicates that those households and individuals who were already poor or vulnerable in the high-growth times are better off during the Covid-19 crisis.

Another caveat is that when the number of time-invariant variables is limited and the R^2 is low, the synthetic panels method provides less precise estimates for poverty and vulnerability transitions. We partially overcame this limitation employing the parametric approach, but we are aware that this solution also has limitations and potential problems.[16]

Our estimates and results are relevant for the design of anti-poverty policies and strategies in a variety of ways. First, they provide insights into some of the characteristics related to suffering from temporary intra-year shocks such as the commonly observed reserve-scarce rainy seasons. This might help in the design of specific emergency or seasonal social programs or help rethinking the existing social protection schemes in a more informed manner. Second, our results provide insights into the characteristics related to upward/downward mobility over longer spans of time, from a situation of nonpoverty into a situation of poverty or vulnerability (and vice versa). This is important, because policies targeting only poverty at a certain moment in time do not ensure that households lifted out of poverty will remain out of poverty. Households or individual characteristics related to the static probability of being poor/nonpoor may be associated differently with the probability of staying poor, becoming vulnerable, or falling into poverty over different time spans. Demographics, education level, and area of residence appear to be associated with different poverty transitions differently, suggesting that different policy responses are required depending on circumstances.

Our results on poverty and vulnerability transitions clearly suggest that providing education possibilities is indeed among the most powerful policies that could decisively increase the chances of upward transitions from the poor and vulnerable groups to the nonvulnerable group.[17] Furthermore, it is essential to target households in rural areas in the central and northern regions of the country for chronic poverty interventions. Conversely, we find that the probability of remaining in the vulnerable group over longer spans of time does not differ much for households in urban/rural areas or in different regions, or in different occupations and for most education levels. Therefore, it would be reasonable to plan as well for a universal social protection policy for the very large group of vulnerable individuals who live just above the poverty line and below the vulnerability line.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the National Statistics Institute of Mozambique (INE) or from the Ministry of Economics and Finance of Mozambique (MEF). Restrictions apply to the availability of these data, which were used under agreement with MEF for this study.

ORCID

Vincenzo Salvucci (iD) https://orcid.org/0000-0003-2638-1596
Finn Tarp (iD) https://orcid.org/0000-0002-6247-4370

ENDNOTES

[1] The household budget survey conducted in 2014/2015 is a mini-panel: households were interviewed thrice during the survey period, but there is not a longitudinal dimension that relates this survey to previous ones.

[2] In their 2017 paper, Dang and Dabalen (2017) included Mozambique among the countries used to evaluate the chronic or transitioning poverty situation of African countries, but they limited their analysis to the household budget surveys 2002/2003 and 2008/2009, which was a period in which poverty rates stagnated (DEEF, 2016). Moreover, they analyze poverty in many African countries and prefer to use the international poverty line of $1.9/day in 2011 PPP dollars, whereas in this study, we use the national poverty lines. Thus, our results are not immediately comparable to those in Dang and Dabalen (2017).

[3] Mambo et al. (2018) estimate for 2016 an increase in the national poverty rate of about 10 percentage points compared to 2014/2015. Simultaneously, Egger et al. (2020) find that the multidimensional poverty reduction trend observed between 2009/2011 and 2015 effectively halted between 2015 and 2018.

[4] For the parametric approach, we use the following values for ρ, as obtained in Salvucci and Tarp (2021): $\rho_{1996/1997-2002/2003} = 0.251$; $\rho_{1996/1997-2008/2009} = 0.408$; $\rho_{1996/1997-2014/2015} = 0.479$; $\rho_{2002/2003-2008/2009} = 0.355$; $\rho_{2002/2003-2014/2015} = 0.594$; $\rho_{2008/2009-2014/2015} = 0.736$.

[5] Lower values of the vulnerability index seemed not to fit the conditions of Mozambique. Indeed, only a small percentage of the population would have been considered middle class applying $P^2 = 15$ (the value employed by Dang & Dabalen, 2017, for their welfare analysis). Conversely, even higher values were considered ($P^2 = 30$, 35, and 40). The results from this sensitivity analysis are provided in the online appendix.

[6] Corresponding to ~4 USD using the 2014/2015 PPP conversion factor.

[7] This may appear as a very high proportion of the population. However, analyzing the real consumption distribution based on the IOF14 reveals that a relatively large proportion of the nonpoor population lies close to the poverty line. The consumption distribution only gets further away from the poverty line between the 80th and the 90th percentile of the distribution. Nevertheless, we considered different values for the vulnerability index and computed the respective poverty/vulnerability transitions. The results from these sensitivity analyses are summarized in the following text and discussed in the online appendix.

[8] To improve clarity, in the following figures we show only the transitions 1996/1997–2002/2003, 2002/2003–2008/2009, and 2008/2009–2014/2015 and not all possible transitions. The remaining transitions provided redundant information.

[9] The study presents an analysis of chronic and transient poverty in Africa. Only Malawi, Madagascar, and Congo DRC show higher probabilities than Mozambique with respect to chronic poverty (Dang & Dabalen, 2017, Table 5 and Figure 1).

[10] Unconditional probabilities for the state "poor, nonpoor," conditional probabilities for the state "poor to nonpoor," unconditional probabilities for the state "nonpoor, nonpoor," and conditional probabilities for the state "nonpoor to nonpoor" are shown in Figures A1–A4, respectively, in the online appendix.

[11] This result is also dependent on the choice of the vulnerability index and vulnerability line. In general, the conditional probability of the state "vulnerable to vulnerable" decreases as the vulnerability index increases (see online appendix).

[12] The latter set of characteristics can be analyzed here even if they are not strictly time invariant because the quarters of the IOF14 represent a true panel. Therefore, the limitations with respect to the characteristics that can be included in the analysis when applying the synthetic panels are not binding in the present application.

[13] We do not show here all the possible transitions but only those that are more common: poor in Q1, Q2, and Q4; nonpoor in Q1, Q2, and Q4; nonpoor in Q1; and poor in Q2 and Q4.

[14] See Club of Mozambique (2020), OCHA (2020), and IFRC (2020) for further details on the shocks.

[15] As analyzed, for example, in Ibraimo and Salvucci (2017), Datt et al. (2000), and Simler (2003).

[16] This was discussed in more detail in the methodology.

[17] We are aware that no causal intepretation can be inferred from the correlations presented, but the relation appeared to be particularly strong.

REFERENCES

Barletta, G., Castigo, F., Egger, E.-M., Keller, M., Salvucci, V., & Tarp, F. (2021). *The impact of Covid-19 on consumption poverty in Mozambique* (WIDER Working Paper 2021/94). UNU-WIDER.

BBC. (2021). Mozambique conflict: *What's behind the unrest?* By Christopher Giles and Peter Mwai. BBC Reality Check. Retrieved August 9, 2021, from https://www.BBC.com/news/world-africa-56441499

Betho, R., Chelengo, M., Jones, S., Keller, M., Hassane Mussagy, I., van Seventer, D., & Tarp, F. (2021). *The Macroeconomic Impact of Covid-19 In mozambique: A social accounting matrix approach*. WIDER Working Paper (Vol. *2021/93*). Helsinki: UNU-WIDER.

Club of Mozambique (2020). *Mozambique: Rainy season 2019–2020 claims 57 lives—INGC*. Retrieved November 13, 2020, from https://clubofmozambique.com/news/mozambique-rainy-season-2019-2020-claims-57-lives-ingc-158156/#:~:text=A%20total%20of%2057%20people,(INGC)%20said%20on%20Monday

Club of Mozambique (2021). *Watch: Nyusi announces much stricter rules—By Joseph Hanlon*. Retrieved August 6, 2021, from https://clubofmozambique.com/news/watch-nyusi-announces-much-stricter-rules-by-joseph-hanlon-196686/

Cruces, G., Lanjouw, P., Lucchetti, L., Perova, E., Vakis, R., & Viollaz, M. (2015). Estimating poverty transitions using repeated cross-sections: A three-country validation exercise. *The Journal of Economic Inequality*, *13*(2), 161–179. https://doi.org/10.1007/s10888-014-9284-9

Dang, H. A. H., & Dabalen, A. L. (2017). *Is poverty in Africa mostly chronic or transient? Evidence from synthetic panel data* (Policy Research Working Paper, No. 8033). World Bank.

Dang, H.-A., & Lanjouw, P. (2013). *Measuring poverty dynamics with synthetic panels based on cross-sections* (Policy Research Working Paper, No. 5550). World Bank.

Dang, H. A., Lanjouw, P., Luoto, J., & McKenzie, D. (2014). Using repeated cross-sections to explore movements into and out of poverty. *Journal of Development Economics*, *107*, 112–128. https://doi.org/10.1016/j.jdeveco.2013.10.008

Dang, H. A., & Lanjouw, P. (2017). Welfare dynamics measurement: Two definitions of a vulnerability line and their empirical application. *Review of Income and Wealth*, *63*(4), 633–660.

Dang, H.A., & Lanjouw, P.(2021). Measuring poverty dynamics with synthetic panels based on repeated cross-sections. Mimeo, update of Dang and Lanjouw (2013).

Datt, G., Simler, K. R., Mukherjee, S., & Dava, G. (2000). *Determinants of poverty in Mozambique: 1996–97* (FCND Discussion Paper No. 78). Food Consumption and Nutrition Division, IFPRI.

DEEF (2016). *Pobreza e Bem-Estar em Moçambique: Quarta Avaliação Nacional*. Direcção de Estudos Económicos e Financeiros, Ministério de Economia e Finanças de Moçambique.

Deutsche Welle. (2020). *Covid-19 em Moçambique: Novo estado de emergência decretado pelo PR*. Retrieved August 11, 2020, from https://www.dw.com/pt-002/covid-19-em-mo%C3%A7ambique-novo-estado-de-emerg%C3%AAncia-decretado-pelo-pr/a-54452845

DNEAP (2010). *Poverty and wellbeing in Mozambique: Third National Poverty Assessment*. Direcção Nacional de Estudos e Análise de Politicas (DNEAP), Ministério da Planificação e Desenvolvimento.

DNPO (1998). *Poverty and well-being in Mozambique: The First National Assessment*. Direcção Nacional da Planificação e Orçamento (DNPO), Ministério de Plano e Finanças.

DNPO (2004). *Poverty and well-being in Mozambique: The Second National Assessment*. Direcção Nacional da Planificação e Orçamento (DNPO), Ministério da Planificação e Desenvolvimento.

DTM & INGC (2020). *Covid-19 impact assessment in the central region of Mozambique (Manica, Sofala, Tete and Zambezia)*. IOM Displacement Tracking Matrix (DTM) and Instituto Nacional de Gestão de Calamidades (INGC). Retrieved August 7, 2020, from https://dtm.iom.int/reports/mozambique-%E2%80%93-covid-19-impact-assessment-central-region-mozambique-june-2020

Egger, E. M., Salvucci, V., & Tarp, F. (2020). *Evolution of multidimensional poverty in crisis-ridden Mozambique* (WIDER Working Paper 2020/69). United Nations University—World Institute for Development Economic Research (UNU-WIDER).

FAO. (2020). *Mozambique | Addressing the impacts of COVID-19 in food crises*. Food and Agriculture Organization of the United Nations (FAO). Retrieved August 7, 2020, from http://www.FAO.org/documents/card/en/c/CA9123EN/

Fields, G., & Viollaz, M. (2013). *Can the limitations of panel datasets be overcome by using pseudo-panels to estimate income mobility?* Paper presented at the ECINEQ Conference, Bari, Italy.

Garcés-Urzainqui, D., Lanjouw, P., & Rongen, G.(2022). Constructing synthetic panels for the purpose of studying poverty dynamics: A primer. *Review of Development Economics*, forthcoming.

Herault, N., & Jenkins, S. P. (2019). How valid are synthetic panel estimates of poverty dynamics?. *The Journal of Economic Inequality*, *17*(1), 51–76.

Ibraimo, M., & Salvucci, V. (2017). *Os Determinantes da Pobreza em Moçambique, 2014/15* (Working Paper 2017). Inclusive Growth Mozambique. Retrieved November 20, 2020, from http://igmozambique.wider.unu.edu/pt/article/os-determinantes-da-pobreza-em-mo%C3%A7ambique-201415

IFRC. (2020). *Information bulletin Mozambique/Buzi: Floods*. International Federation of Red Cross and Red Crescent Societies (IFRC). Retrieved November 12, 2020, from https://reliefweb.int/sites/reliefweb.int/files/resources/IBMZ24022020.pdf. Accessed November 13, 2020.

INE. (2004). *Relatório Final do Inquérito aos Agregados Familiares sobre Orçamento Familiar, 2002/3*. Instituto Nacional de Estatística (INE).

INE. (2010). *Relatório Final do Inquérito ao Orçamento Familiar—IOF-2008/9*. Instituto Nacional de Estatística (INE).

INE. (2015). *Relatório Final do Inquérito ao Orçamento Familiar—IOF-2014/15*. Instituto Nacional de Estatística (INE).

INS. (2020a). *Moçambique regista mais um óbito e 16 casos da Covid-19*. Instituto Nacional de Saúde (INS). Retrieved July 20, 2020, from https://covid19.INS.gov.mz/mocambique-regista-mais-um-obito-e-16-casos-da-covid-19/

INS. (2020b). *Boletim diário Covid-19 nº143 de 7 de Agosto de 2020*. Instituto Nacional de Saúde (INS). Retrieved August 7, 2020, from https://covid19.ins.gov.mz/wp-content/uploads/2020/08/Boletim-diario-COVID-19-N143.pdf

Kroll Associates U.K. Limited (2017, August 1). *Independent audit related to loans contracted by ProIndicus S.A., EMATUM S.A. and Mozambique Asset Management S.A*. Report prepared for the Office of the Public Prosecutor of the Republic of Mozambique.

Mahdi, S., Massingue, A. C. A., Massarongo Chivulele, F. A. P., Baez Ramirez, J. E., Walker, I. D., Mucavele Macule, A. N., De Lemos Botelho Barreto, R. J., & Casal, J. (2018). *Mozambique economic update: Shifting to more inclusive growth*, (No. 131212, pp. 1–54). World Bank. Retrieved October 8, 2020, from http://documents.worldbank.org/curated/en/132691540307793162/Mozambique-Economic-Update-Shifting-to-More-Inclusive-Growth

Mahdi, S., Massingue, A. C. A., Massarongo Chivulele, F. A. P., Tchamo, B. A. S., Casal, J., & Baez Ramirez, J. E. (2019). *Mozambique economic update: Mind the rural investment gap (English)*. World Bank. Retrieved August 7, 2020, from http://documents.worldbank.org/curated/en/480651580155354219/Mozambique-Economic-Update-Mind-the-Rural-Investment-Gap

Mambo, F., Paris, Y., Salvucci, V., & Santos, R. (2018). *Simulating the effect on households' real consumption and poverty of the increase in prices that followed the 2015–16 economic crisis in Mozambique* (WIDER Working Paper 2018/61). United Nations University—World Institute for Development Economic Research (UNU-WIDER). Retrieved from https://doi.org/10.35188/UNU-WIDER/2018/503-9

MNRC. (2017a). *Mozambique news reports and clippings*. Number 367, 17 April. Retrieved from bit.ly/mozamb. Accessed May 30, 2017.

MNRC. (2017b). *Mozambique news reports and clippings*. Number 372, 2 June. Retrieved from bit.ly/mozamb. Accessed June 2, 2017.

Mussagy, I. H., & Mosca, J. (2020). *Micro-simulações dos impactos da covid-19 na pobreza e desigualdade em Moçambique* (Observador Rural No. 96). Observatório do Meio Rural (OMR). Retrieved August 7, 2020, from https://omrmz.org/omrweb/micro-simulacoes-dos-impactos-da-covid-19-na-pobreza-e-desigualdade-em-mocambique/

Navarra, C., & Udelsmann Rodrigues, C. (2018). *Debt, aid and poverty in Mozambique: Lessons learned from the Mozambican debt crisis*. Nordiska Afrikainstitutet.

OCHA. (2020). *Mozambique: Heavy rains and flooding—Flash update no. 1*. United Nations Office for the Coordination of Humanitarian Affairs (OCHA). Retrieved November 13, 2020, from https://reliefweb.int/sites/reliefweb.int/files/resources/ROSEA_20200120_Mozambique_OCHA__FlashUpdateFloods%231_def.pdf

Salvucci, V., & Tarp, F. (2021). *Estimating poverty transitions in Mozambique using synthetic panels—A validation exercise and an application to cross-sectional survey data* (WIDER Working Paper 2021/26). United Nations University—World Institute for Development Economic Research (UNU-WIDER). WIDER Working Paper 2021/26—Estimating poverty transitions in Mozambique using synthetic panels: A validation exercise and an application to cross-sectional survey data (unu.edu).

Saute, R., Murrugarra, E., Casal, J., & Gallego-Ayala, J. (2020). *COVID 19 in Mozambique: A team effort to ease the economic hardship on families*. Retrieved October 21, 2020, from https://blogs.worldbank.org/nasikiliza/covid-19-mozambique-team-effort-ease-economic-hardship-families

Simler, K. (Ed.) (2003). *Rebuilding after war: Micro-level determinants of poverty reduction in Mozambique* (Vol. 132). IFPRI.

UNICEF Mozambique. (2020). *The impacts of COVID-19 on children in Mozambique* (COVID-19 Policy Note PN-01). Retrieved August 11, 2020, from https://www.unicef.org/mozambique/media/2531/file/The%20Impacts%20of%20COVID-19%20on%20Children%20in%20Mozambique%20.pdf

WHO. (2021). *COVID-19 dashboard*. World Health Organization, 2020. Retrieved August 6, 2021, from https://covid19.WHO.int/

World Bank. (2018). Mozambique poverty assessment: Strong but not broadly shared growth. Washington, DC: World Bank. https://www.worldbank.org/en/news/infographic/2018/11/14/mozambique-poverty-assessmentstrong-but-not-broadly-shared-growth

World Bank. (2020a). *Mozambique—Performance and learning review of the country partnership strategy for the period FY17-FY21 (English)*. World Bank. Retrieved August 7, 2020, from http://documents.worldbank.org/curated/en/761131588557691907/Mozambique-Performance-and-Learning-Review-of-the-Country-Partnership-Strategy-for-the-Period-FY17-FY21

World Bank. (2020b). *GDP growth (annual %)—Mozambique*. World Bank National Accounts data and OECD National Accounts data files. Retrieved August 10, 2020, from https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?cid=GPD_30&end=2019&locations=MZ&start=1992

SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.