NIGER

SELECTED ISSUES

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NIGER

SELECTED ISSUES

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Approved By
The African Department

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CONTENTS

INTRODUCTION

1.   **This Selected Issues Paper aims at providing an analytical underpinning for the policy recommendations of the 2022 Article IV Consultation with Niger.** The different chapters address key development challenges for the country and contribute to the reflection on policies to build resilience and address fragility.

2.   **The first chapter assesses the efficiency of social spending.** The findings suggest that social programs typically are not well targeted and there are significant coverage gaps. Therefore, Niger would benefit from moving away from a system based on untargeted subsidies (e.g., distribution of food and fertilizers at moderate prices) to a system based on targeted social safety nets.

3.   **The second chapter explores the state of gender equality and estimates the macroeconomic gains from reducing gaps in education.** Using a micro-founded general equilibrium model, the analysis shows that Niger has made progress toward higher educational attainment for girls, but the country still lags others in the region. Simulations suggest that closing gender gaps in education would boost long-term GDP by 11 percent.

4.   **The third chapter addresses the issue of financial inclusion**. Niger lags behind other WAEMU countries in terms of access to and use of financial services. Key priorities to enhance financial inclusion would include efforts to tackle low financial literacy, promote digitalization (including through increased competition in the telecommunications sector), and address informality.

5.   **The fourth chapter examines the effects of climate and conflict shocks on household welfare.** The results of an analysis using household survey data show that when rainfall decreases by one standard deviation, per capita income falls by 11 percent. Moreover, when the number of conflict related deaths increases by 10 percent, farm income and the value of production decrease by 10 and 8 percent respectively.

6.   **The fifth chapter looks at the economic effects of climate change and food insecurity.** Simulations from a general equilibrium model indicate that cash transfers appear more effective than fertilizer subsidies at safeguarding households' welfare, including nutritional status. The results highlight the need to operationalize a better coordinated national social safety net system and reform agricultural fertilizer subsidy systems to improve their targeting, efficiency, and sustainability.

7.   **Finally, the sixth chapter discusses horizontal policies to promote export diversification.** The empirical results from panel regressions indicate that reforms to enhance human capital and the quality of infrastructure, to promote digitalization, to remove barriers to trade and improve governance are likely to yield the largest gains in terms of diversification for Niger.

THE EFFICIENCY OF SOCIAL SPENDING IN NIGER[1]

Niger faces daunting development challenges despite robust economic growth over the past decade. Poverty remains elevated and a large share of the population faces food insecurity. Niger also lags in terms of education and health outcomes, with demographic dynamics putting pressure on these systems. There is evidence of inefficiencies in education, health, and social protection spending. Programs typically are not well targeted and there are significant coverage gaps. Improving the living standards of the Nigerien as well as education and health systems, a priority of the government, would require not only scaling-up education, health and social protection spending, but also strengthening social protection programs through better targeting, supporting girls' education, and moving away from general subsidies.

A.   Overview of Niger's Social Indicators and Government Priorities

1.   Niger continues to face daunting development challenges and recent improvements have been offset by a growing population. GDP per capita remains below its 1980 level, and the country remains one of the poorest in the world. Niger's Human Development Index in 2022 was ranked at the bottom 189th out of 191 countries. Under five mortality rate is still elevated at 78 per 1,000 live births and life expectancy at birth is 63 years. Poverty incidence at 41.4 percent in 2021 is high with about 10 million Nigerien living below the national poverty line––of which two thirds live in three regions: Zinder, Maradi, and Dosso. Rapid population growth (more than 3 percent per year) generates significant pressures in terms of social spending and high fertility rates hinder the empowerment of women.

2.   Cognizant of these challenges, Niger is committed to scale-up and preserve social spending to support the poor and vulnerable population. Regarding education, the government is committed to increase the quantity and quality of education by building education infrastructures, especially classrooms made with durable materials and residential school facilities for girls and revising the hiring process and career prospects of teachers to attract skilled teachers. Regarding social safety nets, the authorities would like to increase the coverage of social programs, especially to most vulnerable population, also with the objective to reduce gender inequality. They are also taking steps to improve the targeting of social programs by creating a unified social registry.

3.   The IMF is supporting the authorities in their efforts. One of the program's objectives is to improve the effectiveness of public spending with the emphasis on social spending and poverty reduction expenditure. Indeed, the program includes an on-budget floor on social spending. It also puts strong emphasis on revenue mobilization, the quality of spending, and re-prioritization of

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spending to create the fiscal space needed to scale-up priority spending in education, health and social protection and improve their efficiency.

4.   **The main objective of this paper is to provide an overview of social spending in Niger and assess its efficiency.** Sections B.   and C.   present Niger's education and health outcomes as compared to peers and discuss the trends and the efficiency of education and health spending. Section E.   provides an overview of existing social programs in Niger. Section E compares Niger's social protection programs with peers and describes their coverage, adequacy and targeting, as well as their impact on poverty and inequality. Section F.   further assesses the efficiency of targeting in social programs using the 2018/19 household survey. Section G.   concludes and lays out some policy recommendations.

B.   Education Outcomes and Efficiency of Education Spending

5.   **The analysis in this and next section is based on FAD's Expenditure Assessment Tool (EAT).** This tool focuses on spending levels, composition, and outcomes in a variety of areas ranging from the wage bill, investment, energy subsidies, health, education, and social protection. It provides comparisons against regional and income group benchmarks. It draws upon diverse datasets, including ASPIRE, World Bank, World Health Organization, World Economic Outlook, and IMF Pension Indicators. The dataset covers indicators from around 2000 until 2018-19 as the latest available value (although there is wide variability across countries for the latest available value).[2]

6.   **Niger lags behind peers in educational outcomes.** The adult literacy rate is 35 percent (implying 6.5 adults over 10 are illiterate) compared to 45 percent in the WAEMU and 66.4 percent in SSA and LIDCs (Figure 1). Net enrollment in primary and secondary education levels stand at 65.1 percent and 20.1 percent respectively, also lagging considerably behind peers, and possibly hindering even worse outcomes for girls.

7.   **Even though, the share of education spending in percent of GDP in Niger is broadly in line with peers, education spending per student is much lower than peers at all levels of education (Figure 1).** After increasing over the 2000s, education spending declined reaching 3.8 percent of GDP in 2020, which is above the average in sub-Saharan Africa (SSA) countries but slightly below the WAEMU average of 4 percent of GDP. However, spending per student in primary and secondary education is less than half than SSA and low-income countries (LIC) countries and the teacher student ratio is lower than peers. This illustrates i the challenge to keep up education spending at par with population growth. The comparison of spending by education level (last chart on the right) reveals that spending per student at the tertiary level is much higher than for the other levels.

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[2] However, this period does not cover the COVID-19 pandemic which has significantly affected government expenditures and socio-economic indicators. According to the World Bank (2021), The COVID-19 pandemic growth slowdown is estimated to have pushed up to an additional 270,000 people into poverty in Niger.

Figure 1. Niger: Education Expenditure and Indicators, 2001-18 and Most Recent Available Year

Sources: FAD EAT tool, and IMF staff calculations
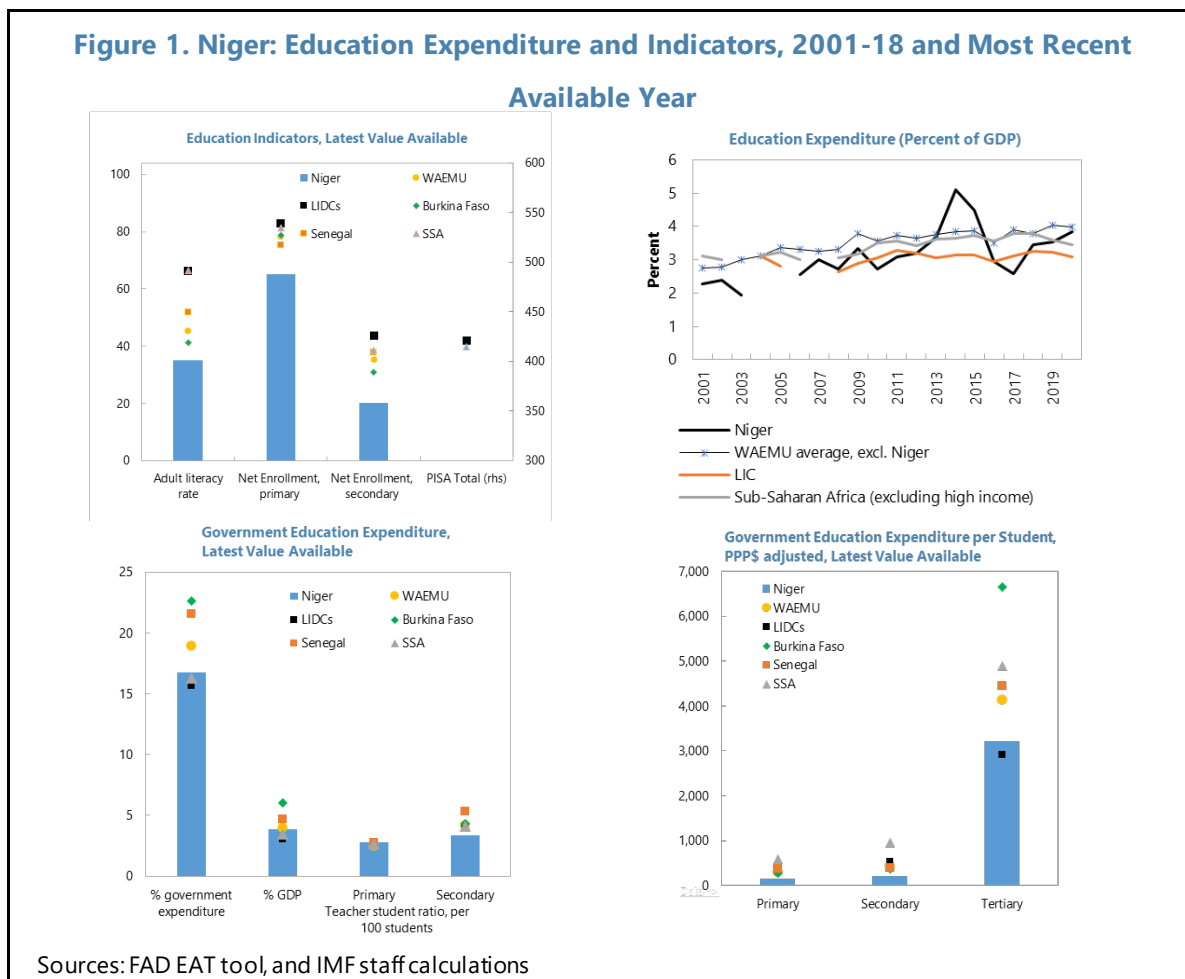
8.   There are several indicators pointing to stark inefficiencies in education spending both at the primary and secondary levels.[3] Overall, Niger is situated well below the efficiency frontier for different measures of education spending and education outcomes. Several countries in the WAEMU, SSA, and LIDCs groups spend less than Niger at both the primary and secondary levels and yet have better net enrollment rates (Figure 2). For example, Ethiopia has a similar expenditure per student ratio, but presents a net enrollment rate in primary education of 84.6 percent compared to 65.1 percent in Niger. While several other countries spend less per student and get better outcomes (e.g., Rwanda, Madagascar, Malawi, Burundi). Similarly, several LIDC and SSA countries with comparable teacher student ratio get better outcomes, closer to 80 percent net enrollment in primary and close to 30 percent in secondary (compared to 65 percent and 20 percent respectively in Niger). Moreover, Niger has a lower teacher student ratio in secondary education (3.4 per 100

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[3] Even though the analysis presented allows to control to some extent for some economic or social determinants of education by comparison with peers, a more granular analysis is required to identify the areas for efficiency gains within education spending.

students) than most peers (around 4.1 per 100 students), which might explain the gap in net enrollment rates with respect to other countries.

Figure 2. Niger: Efficiency Frontier in Primary and Secondary Education, Most Recent Available Year

Sources: FAD EAT tool, and IMF staff calculations
1/ Dashed lines are the average of WAEMU countries. The efficiency frontier is calculated using the Data Envelopment Analysis (DEA) technique, which provides efficiency scores based on the input and output variables. The frontier is constructed such that no other country produces the same or more output with a certain amount of input.

C.   Health Outcomes and Efficiency of Health Spending

9.   Despite efforts to dedicate resources to the health sector, outcomes are lagging, and coverage is low. Health spending in percent of GDP is comparable, although higher, to countries in the WAEMU and LIDCs (Figure 3). It has averaged 7.4 percent of GDP in the last two decades compared to 5.5 percent of GDP by WAEMU countries and 5.9 percent of GDP by LIDCs. But expenditure per capita has yet to catch up to the level of peers. However, LIDCs and SSA countries have fewer infant deaths, and higher life expectancy, more hospital beds, nurses, and physicians.

Niger's ratio of physicians at 0.019 per 1000 people is one of the lowest in the world. The vast extension of the country and spatial distribution of the population compounds the shortage of healthcare workers and contributes to low health service coverage.

Figure 3. Niger: Health Expenditure and Indicators, 2001-18 and Most Recent Available Year

Sources: FAD EAT tool, and IMF staff calculations
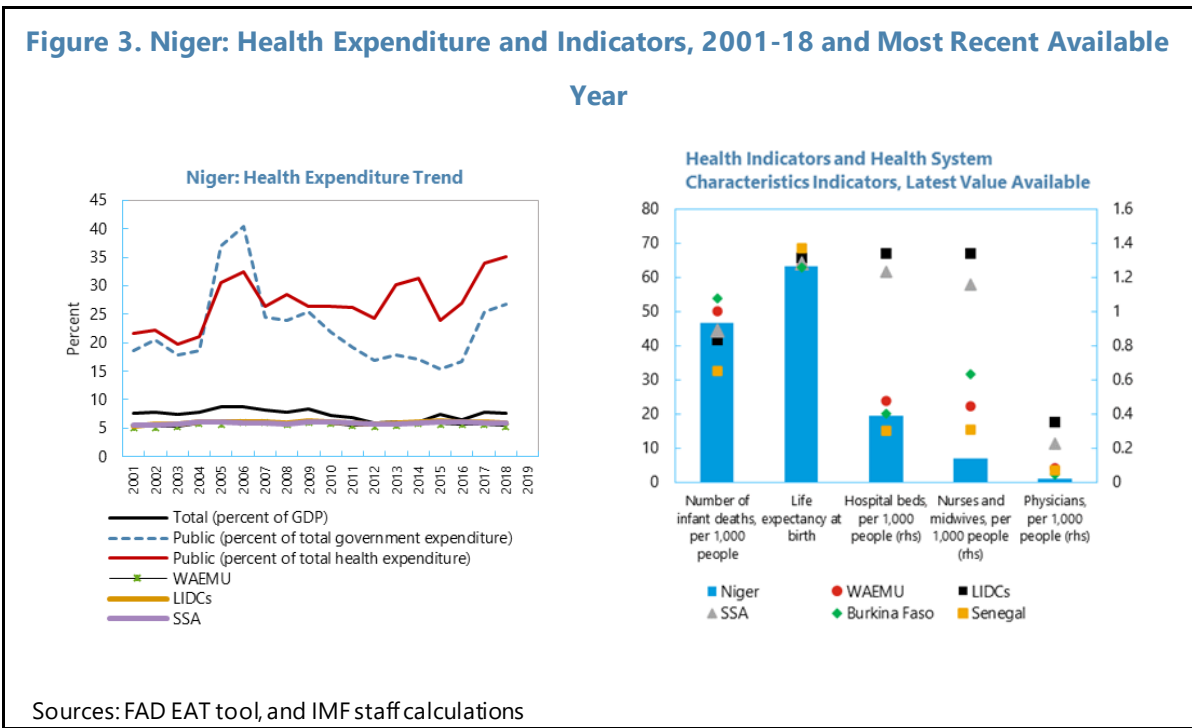
10.   There are some inefficiencies as well in the health sector. Both spending per capita and health adjusted life expectancy (HALE)[4] are lower than LIDC and SSA countries (Figures 3 and 4). Yet, there are countries that spend less on health in per capita terms, but have slightly better outcomes (e.g., Madagascar, Ethiopia, and Malawi). However, compared to education sector, the inefficiencies in the health sector are less pronounced as shown by a lower distance to the efficiency frontier.

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[4] According to the World Health Organization this is defined as the "average number of years that a person can expect to live in "full health" by taking into account years lived in less than full health due to disease and/or injury".

Figure 4. Niger: Health Expenditure and Health Efficiency Frontier, Most Recent Available Year

Health Expenditure--Different Metrics, Latest Value Available

Health Efficiency Frontier, Latest Value Available (0 - 5,000 PPP$) 1/

Health Efficiency Frontier, Latest Value Available 1/

Sources: FAD EAT tool, and IMF staff calculations

1/ Dashed lines are the average of WAEMU countries. The efficiency frontier is calculated using the Data Envelopment Analysis (DEA) technique, which provides efficiency scores based on the input and output variables. The frontier is constructed such that no other country produces the same or more output with a certain amount of input. Health expenditure refers to public and private spending.

D. An Overview of Social Protection Programs in Niger

11.   The main social protection programs in Niger cover social safety nets, social insurance, labor market, and general subsidies. According to the World Bank (2019), social insurance expenses more than doubled between 2008 and 2017 reflecting increased payroll, safety nets tripled, while general subsidies (particularly petrol) have declined by 78 percent.

12.   Social safety net programs comprise food distribution and safety nets for resilience. The former is the main short-term response to temporary food insecurity and the latter are more long-term and predictable cash transfers to chronically poor and vulnerable households. Typically,

coverage by these programs has not been sufficient and has not been conducive to reduce chronic poverty. The main programs are as follows:

- **in-kind distributions** (targeted food distribution and subsidized sales of cereals). These are part of Niger's system for prevention and management of food crises. Targeted food distribution covers the food needs of moderately and severely food insecure households in vulnerable areas and for victims of climate shocks and conflict, using a community-based method––the household economy approach (HEA). While transiently food insecure households are targeted using a geographical approach. Sales of cereals at subsidized prices target moderate food insecure households, through the OPVN (a public institution in charge of these sales).

- **nutrition programs** focused on the search for solutions to chronic malnutrition.

- **unconditional cash transfers under the National Safety Net Project (NSNP) and World Food Program (WFP) Resilience approach.** The NSNP aims to target poor and chronically food insecure households combining both geographic targeting (where poverty rates determine geographical allocations) and then poor households are identified through proxy means test. The launch of the Adaptative Safety Net project (ASNP 2) in 2019 has increased cash transfers delivered, with 120,000 households receiving a monthly transfer of 15,000 CFA for 24 months. The WFP aims to target the poorest crisis-affected households over a three-year period, using the HEA targeting method.

- **conditional cash transfers for education,** covering all levels of education. The largest share goes to university scholarships and allowances, but there are also programs to keep children in secondary school and in primary school to mitigate the high drop-out rates. Particularly, there are programs to support girls' continuation of education and reduction of early marriage through cash transfers conditional on the girls' enrollment and attendance to school and their families' participation on certain activities.

- **cash for work**, consisting of temporary public works activities, aims at providing income and learning skills to food-insecure people affected by weather shocks, helping them protect their assets and consumption.

- **school feeding programs** aimed at increasing school attendance. These programs run in over 2000 primary schools. WFP is the leading partner supporting school canteens in 7 out of 8 regions in Niger.

- **targeted agricultural subsidies,** covering typically free distribution of seeds and animal restocking, as well as sales of livestock feed and fertilizers at subsidized prices. Targeting of these subsidies has been an issue. FAO is the leading partner in this area of intervention.

- **free health care,** for pregnant women and children under 5.

13.   The adaptative social protection system has been scaled-up in response to the COVID-19 crisis, and diverse analysis show that increased cash transfers for resilience is desirable. With contributions from different partners, emergency cash transfers were distributed to households in urban and rural areas, covering about 65 percent of the individuals impacted by the crisis. An impact evaluation of the World Bank found that cash transfers induced lasting investments in productive assets and activities aimed at raising revenues among the very poor. They also found a positive impact on households from cash transfers to build resilience to shocks. Moreover, IMF staff analysis found that cash transfers are more effective than fertilizer subsidies at safeguarding household welfare.[5]

E.   Profile, Impact and Efficiency of Social Protection and Labor

14.   The Social Protection and Labor Assessment Tool (SPL-AT) is used for profiling social protection expenditures in Niger as well as analyzing their impact and efficiency. This tool uses data from various sources including the World Bank PovcalNet and ASPIRE data, the International Labour Organization, the World Economic Outlook of the IMF. It provides a broad understanding of the country context (e.g., on poverty, inequality, and labor market), SPL expenditures, and SPL performance by analyzing their coverage, adequacy, targeting, and efficiency while allowing for comparison with some country and country groups comparators.

15.   Social assistance expenditures in Niger remain among the lowest in the world, with a concentration on food and in-kind assistance (Figure 5).[6] In 2017, Niger spends only 0.42 percent of GDP on social assistance programs, which is lower compared to SSA and LIDC medians at 0.89 and 1.15 percent of GDP, respectively. This amount is also 2 times lower than in Senegal and 4.4 times lower than in Burkina Faso. In addition, contrary to country comparators and SSA and LIDC medians, Niger's social assistance spending is concentrated on food and in-kind assistance (0.36 percent of GDP or 84.8 percent of all social assistance expenditures), followed by conditional cash transfers (0.04 percent of GDP), school feeding (0.02 percent of GDP), and public works (0.01 percent of GDP).

16.   The coverage of social protection and labor programs (SPL) in Niger is inadequate (Figure 6). At 21.3 percent of the population in 2017, SPL coverage in Niger is lower relative to WAEMU median, but like SSA and LIDC medians. This suggests that around 80 percent of Nigeriens are not covered by any kind of SPL, increasing their vulnerability to the compounding shocks faced by the country. SPL coverage is particularly low for labor market and social insurance programs (less than 1.5 percent). This suggests that almost all old age pensioners are left without pensions, reflecting the predominance of the informal sector. In contrast, a higher percentage of the population (46.1 percent) receives assistance via private transfers in Niger, which is higher than in its

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[5] Please see the Selected Issues Paper on "Economic Effects of Climate Change and Food Insecurity in Niger".

[6] The spending is available only for social assistance programs, which are a fraction of all SPL programs. These programs include cash transfer, in-kind, public works, school feeding, social pensions, subsidies and any other social assistance programs.

comparators.[7] Difficulties in reaching the population living in conflict-affected areas are not captured by this analysis but constitute an important impediment to social assistance.

Figure 5. Niger: Total Social Assistance Spending (percent of GDP), Most Recent Available Year

Sources: FAD EP SPL-AT tool, and IMF staff calculations
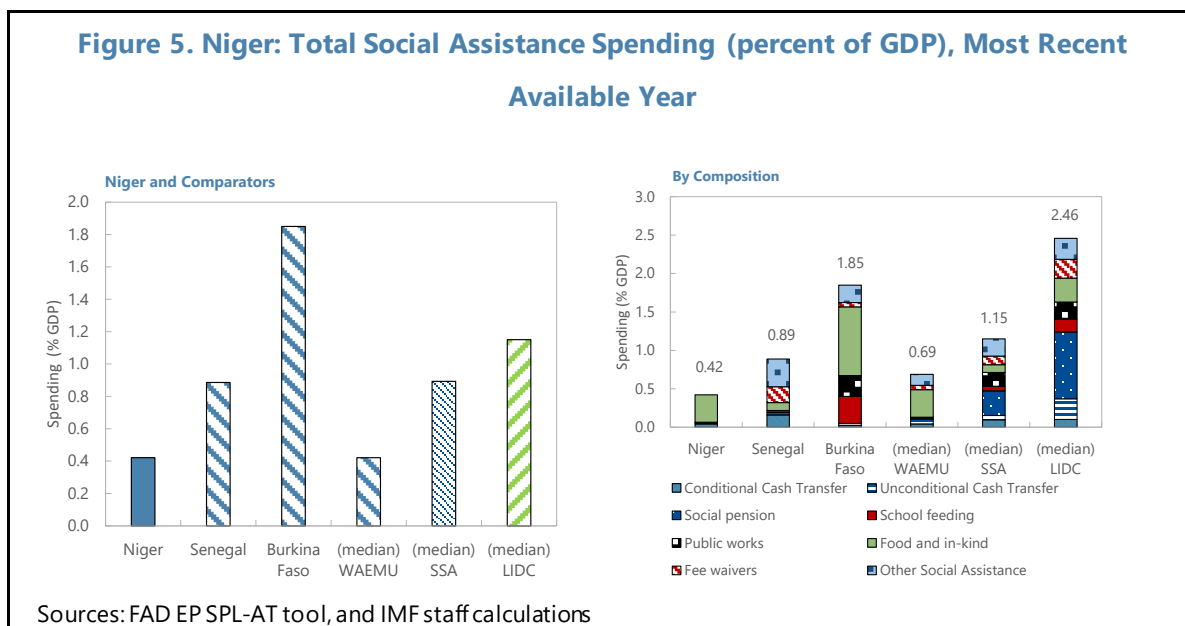
17.   Moreover, the top (richest) quintile is more covered by SPL benefits than the bottom (poorest) quintile (Figure 6). Only 17.2 percent of the bottom quintile has access to any kind of SPL benefits, while the other quintiles have a higher coverage (between 19.5 and 27.3 percent for top quintile and third quintile, respectively). The richer segments of the population are more likely to receive any king of SPL benefits than the poorest. Also, the poorest in Niger are less covered relative to SSA and LIDC medians. Therefore, there is scope to increase the efficiency of SPL programs through better targeting of expenditures.

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[7] Private transfers include both domestic private transfers such as inter-family and in-kind gifts and monetary transfers, alimony, income support from charity, private zakat, and international private transfers (remittances from abroad).

Figure 6. Niger: SPL Coverage (percent), Most Recent Available Year

Coverage for All Social Protection and Labor, Most Recent Available Year

Coverage by quintile, All Social Protection and Labor, Most Recent Available Year

Sources: FAD EP SPL-AT tool, and IMF staff calculations

Notes: Coverage is defined as the share of a population or subpopulation (e.g., quintile) that receives a social protection benefit.
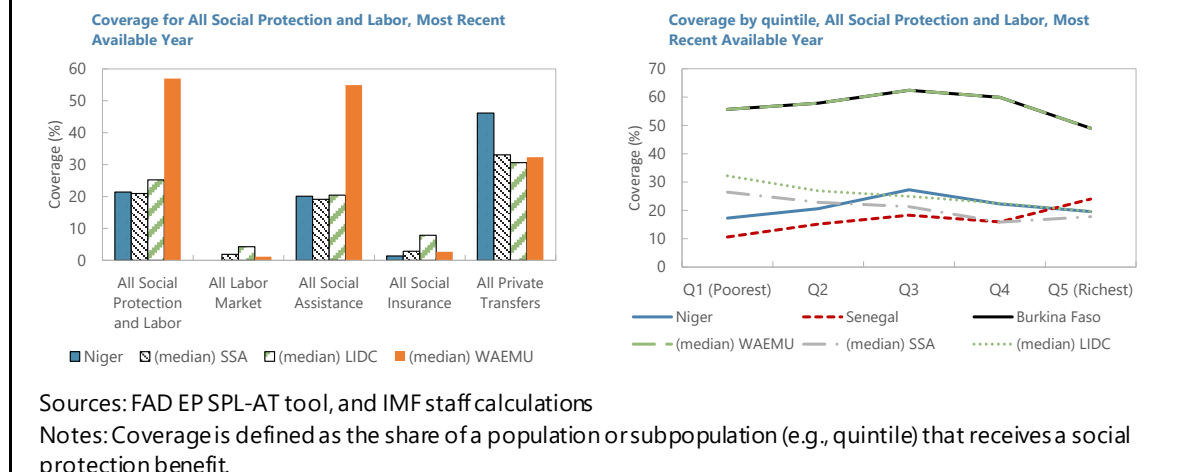
18.   While social protection expenditures have substantially increased in nominal terms, they are still not enough to have a significant impact on poverty (Figure 7). According to the World Bank (2019) estimates, social protection expenditures have more than doubled over 2008-2017, peaking in years of crises. However, the total amount of funding for SPL benefits can cover only a small share of the population in need of support. At 3.4 percent of beneficiaries' income, the adequacy of benefits is significantly lower, relative to WAEMU, SSA, and LIDC medians at 21.7, 39.1 and 33.4 percent, respectively. This means that the total transfer amount received by all beneficiaries in the population as a share of their total income is inadequate in a country where the poverty incidence is at 40.8 percent. This is acute for social assistance (1.6 percent), especially in-kind programs (1.1 percent). For social insurance and private transfers programs, the adequacy is somehow higher at 13.1 and 8.6 percent, but still lower relative to peer countries.

19.   In addition, the adequacy of SPL benefits is relatively lower for the poorest (Figure 7). When disaggregating by quintile of incomes, the adequacy of benefits is lower for the bottom quintile at 3.8 percent than the top quintile at 4.2 percent. Also, the adequacy for overall SPL programs and for the bottom quintile is 7 and 19 times lower in Niger as compared to SSA and LIDC medians, respectively. For private transfers programs, this is less acute as the adequacy for the bottom quintile at 13.3 percent is almost like SSA median but more than 3 times lower than LIDC median. This highlights the weakness of the SPL programs to provide significant support for poor and vulnerable populations.

Figure 7. Niger: SPL Adequacy (percent), Most Recent Available Year

Adequacy of Benefits for All Social Protection and Labor, Most Recent Available Year

Adequacy of Benefits by quintile, All Social Protection and Labor, Most Recent Available Year

Niger ◼ (median) SSA ▨ (median) LIDC ◻ (median) WAEMU ◼

Niger — Senegal --- Burkina Faso —
(median) WAEMU - (median) SSA --- (median) LIDC ···

Sources: FAD EP SPL-AT tool, and IMF staff calculations

Notes: Adequacy is defined as the total transfer amount received by all beneficiaries in the population (or quintile) as a share of the pre-transfer total income over expenditure of beneficiaries (in that quintile).

20.   The targeting of SPL programs remains weak, and programs tend to be regressive (Figure 8). This is exemplified by a relatively lower beneficiary incidence for the poor with only 16.1 percent of all beneficiaries being in the bottom (poorest), the lowest share as compared to the other quintiles. For instance, the share of beneficiaries is 25.4 percent for the third (quintile), 20.9 percent for the fourth quintile, and 18.2 percent for the top (richest) quintile. In other words, richer segments of the population are more likely to participate in SPL programs than poorer ones, contrary to what occurs in comparator countries. Moreover, SPL programs are regressive similar to WAEMU median, contrasting a somehow pro-poor allocation of benefits for SSA and LIDC medians. Indeed, half of the SPL benefits goes to the richer and wealthier. The share of the total amount of all SPL benefits received by people in the bottom quintile at 7 percent is the lower across all quintiles, and 7 times lower than the one received by the top quintile. This finding is generally confirmed for all types of SPL programs and more acute for social insurance programs.

21.   Overall SPL programs are less efficient in Niger than typically is the case in other SSA and LIDC countries (**Figure 9**). Simulated effects of SPL spending on poverty and inequality show a lower impact and efficiency of SPL in Niger compared to SSA and LIDC medians by examining pre and post transfer indicators. SPL programs reduce the poverty headcount by about 2 percent in Niger, which lower than for SSA and LIDC medians (reduction of 2.7 and 7.3 percent, respectively) but higher than for the WAEMU median (reduction of 0.6 percent). Also, SPL spending also reduce the poverty gap by close to 1.8 percent in Niger, lower than for SSA and LIDC medians (reduction of 5.07 and 14.06 percent, respectively) but higher than for WAEMU median (0.82 percent). In line with the findings on SPL coverage and adequacy, the simulations confirm that SPL programs are somewhat regressive as they increase inequality by 0.07 percent in Niger but lower than for WAEMU median (increase of 0.79 percent), while they reduce it by 0.41 and 2.46 percent for SSA and LIDC medians.

Figure 8. Niger: SPL Beneficiary and Benefits Incidence (percent), Most Recent Available Year

Sources: FAD EP SPL-AT tool, and IMF staff calculations

Notes: The beneficiary incidence is the share of beneficiaries by income/expenditure quintile. The benefit incidence is the transfer share that each quintile receives. Both indicators should be considered to analysis the targeting of SPL.

22. **For all social assistance programs, also for in-kind and public works programs, the efficiency is also low compared to SSA and LIDC medians.** Their impact on the reduction of poverty headcount, poverty gap, and inequality is weak as they reduce them by 1.71 percent, 1.56 percent, and 0.28 percent, respectively. These impacts are lower than SSA and LIDC medians, but higher than WAEMU medians, indicating that there is room to improve the efficiency of SPL programs in Niger.

23. **Similar results are found for contributory pensions.** These programs have a lower impact on reducing poverty headcount, poverty gap with an estimated reduction of 0.34 and 0.21 percent, respectively, which is lower than for WAEMU (0.46 and 0.82 percent), SSA (1.36 and 1.92 percent, respectively) and LIDC (5.17 and 9.24 percent, respectively) medians. On inequality, the contrary of the expected effect is found for Niger and WAEMU with contributory pensions increasing inequality by 0.35 and 0.72 percent, respectively, while they are neutral or reduce it for SSA and LIDC medians by 0.01 and 1.76 percent, respectively.

Figure 9. Niger: Impact and Efficiency of SPL (percent), Most Recent Available Year

Simulated Impact Variables for All Social Protection and Labor, Most Recent Available Year
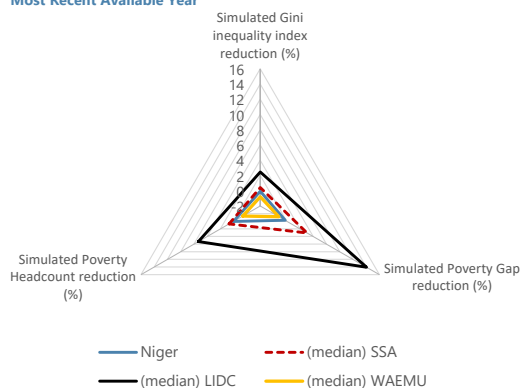
Simulated Impact Variables for All Social Assistance, Most Recent Available Year
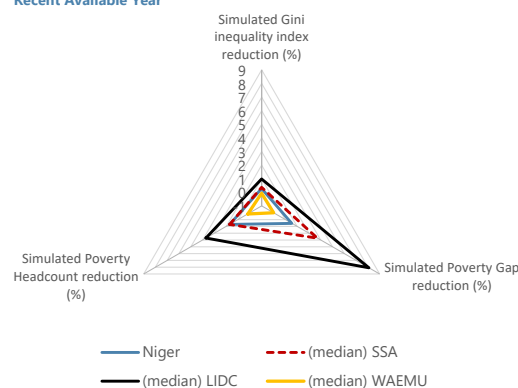
Simulated Impact Variables for Contributory Pensions, Most Recent Available Year
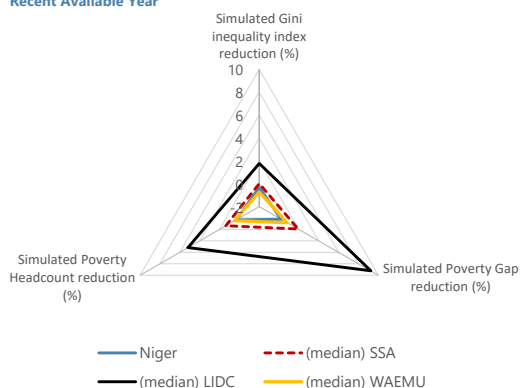
Simulated Impact Variables for All Private Transfers, Most Recent Available Year
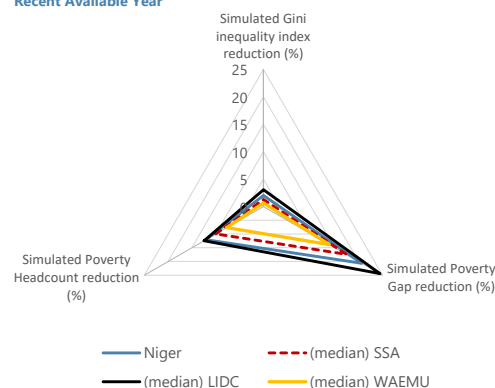
Sources: FAD EP SPL-AT tool, and IMF staff calculations

Notes: i) the Gini inequality reduction is obtained as a simulated percentage change in Gini coefficient due to SPL programs. The calculation is as follows: (Gini coefficient pre-transfer - Gini coefficient post-transfer) / Gini coefficient pre-transfer; ii) the poverty headcount reduction is obtained as a simulated percentage change of poverty headcount due to SPL programs by comparing the metric pre and post transfer. The calculation is as follows: (poverty headcount pre-transfer - poverty headcount post-transfer) / poverty headcount pre-transfer; iii) the poverty gap reduction is obtained as a simulated percentage change of poverty gap due to SPL programs by comparing the metric pre and post transfer). The calculation is obtained as follows: (poverty gap pre-transfer - poverty gap post-transfer) / poverty gap pre-transfer.

F. Efficiency of Targeting in Social Programs

24.   To complement the analysis in the previous sections, the Harmonized Survey on Households Living Standards 2018–19 (EHCVM) is used to assess the determinants of access to social programs in Niger and their efficiency.[8] This survey covers more than 6,000 households and provide very detailed information on safety nets, food insecurity, demographics, education, health, consumption, household assets, and shocks and survival strategies. We further examine whether social programs in Niger are well-targeted to poor and vulnerable populations using this household survey. To do so, we focus on three kinds of programs, such as i) food programs, ii) health programs, and iii) government transfers programs.[9]

25.   Access to social programs in Niger is low, particularly for both conditional and unconditional government cash transfers. 12 percent of households indicate to have benefited from food programs over the last 12 months prior to the survey. This figure stands at 14.9 percent for households that experienced any kind of shocks. Access to health programs is higher with 38 percent of households declaring to have been enrolled in a health program, a similar percentage relative to households that experience any kind of shocks. However, access to both conditional and unconditional government cash transfers is very limited with only 0.71 percent of households mentioning that they received cash transfers from the government. This figure is slightly higher but still very low for households that suffered any kind of shocks at 0.83 percent.

26.   We apply linear probability models (OLS regressions) to assess the determinants of access to social programs in Niger. The dependent variables capture whether the household received a specific type of social program over the last 12 months before the survey. The dependent variables are regressed on the set of criteria that should guide the targeting of social programs. Indeed, appropriate targeting of social programs should include, beyond geographical targeting, other criteria such as i) whether the household is poor (both absolute and relative poverty) or not, ii) whether the household is food insecure or not, iii) whether the household is affected by shocks (e.g., family, natural, agriculture, conflict shocks), and iv) other household characteristics (e.g., household size and gender, disability status, level of education, age of the household head). The results are presented in –Table 3 in the Appendix, where we show the findings for the set of poverty criteria in column (1), the set of hunger or food insecurity criteria in column (2), the set of shocks criteria in column (3), the set of household and household head characteristics in column (4).

27.   Overall, the results point to inefficiencies in the targeting of social programs.
Specifically, we find some evidence of geographical targeting for food and health programs but not for government cash transfers, as reflected in the significance of the regional dummy coefficients.

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[8] This survey is implemented by the National Institute of Statistics (INS) with support from the World Bank and the WAEMU Commission.

[9] The food programs include distributions of food (particularly of cereals), school feeding programs, food supplement for children, food for work programs. The health programs include care for children under 5 years old, donation of impregnated mosquito net, vaccination, annual medical checkup, medical treatment and donation of medications. The government transfers programs are conditional and unconditional cash transfers to population.

This is consistent with the fact that food shock response programs use geographic targeting. Generally, poverty, hunger or food insecurity and household characteristics cannot explain the targeting of social programs, while households affected by shocks have a higher likelihood to participate in a program. We also show some evidence that non-poor households and households in regions with fewer number of poor have a higher likelihood to benefit from social programs, highlighting some inefficiencies and leakage in social programs and under-coverage of poor population.

- **There are indications that food programs are inadequately targeted, as the coefficients associated with poverty and food insecurity indicators tend not to be significant in the regressions (Table 1).** This suggests that poverty and food insecurity criteria do not determine access to food programs in a systematic way. Findings are similar for other household characteristics criteria, with the exception that households whose household head achieve tertiary education are less likely to be included in social programs than households with a head with no education. Interestingly, the results reveal that the type of shocks faced by households matters. Households that experienced family shocks, natural disaster shocks, and conflict shocks have a higher likelihood to participate in a food social program. However, agricultural shocks (such as higher prices for food and fertilizers, decrease of agricultural production, etc.) do not seem to determine the targeting of food social programs.[10]

- **Households in poorer regions of the country are more likely to participate in health programs, but these programs are not systematically targeted to poor and food insecure population within regions (Table 2).** Households in the regions of Zinder and Maradi where poverty is higher are more likely to receive health programs. In addition, there is an inverted U relationship between household consumption per adult equivalent and the probability to be selected for a health program. In other words, both the poorest and richest households are less likely to receive these programs, while households in the middle of the consumption distribution have a higher likelihood to be selected. Food insecurity, which is a critical determinant of health conditions, does not determine the targeting of health programs. Households that experienced agricultural shocks and non-agricultural employment shocks are more likely to participate in health programs, while those experiencing natural disaster shocks are less likely to do so.

- **Targeting issues are even more pronounced for government cash transfers programs**, **but households facing conflict shocks are more likely to participate (Table 3).[11]** Neither poverty, food insecurity, nor household characteristics criteria (except for the age of the household head) can determine access to government cash transfer programs. Regarding shocks, only households

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[10] Regarding geographical targeting, we show that compared to Niamey, households in the regions of Diffa and Dosso where there are fewer number of poor have a higher likelihood to be selected, while those in the regions of Zinder and Maradi where poverty is higher are less likely to receive food programs.

[11] One caveat is worth noting. Our analysis cannot differentiate between conditional and unconditional government cash transfers. The targeting issues highlighted in this analysis are relevant for unconditional government cash transfers which are intended to support poor and vulnerable population. However, the objective of conditional cash transfers is not to reduce poverty but to improve education and health outcomes. As such, the conditional cash transfers do not have to target poor and vulnerable population.

that experienced conflict shocks have a higher likelihood to participate in these programs, while the other shocks are not significant.

G.   Concluding Remarks and Policy Recommendations

28.   Niger would benefit from moving away from a system based on untargeted subsidies (e.g., distribution of food and fertilizers at moderate prices) to a system based on targeted social safety nets. Social programs should aim at ensuring full coverage of the poorest and most vulnerable populations (starting with those at the bottom quartile) using means testing or proxy-means testing of social assistance transfers, in combination with geographic methods, as needed.[12]

29.   Progress is needed to improve individual and geographic targeting, including through the establishment of a unified social registry (USR) with assistance from the World Bank. Consolidating the information of potential beneficiaries in one database would bring in efficiency gains by the integration of the information of different systems and would improve the efficiency and individual targeting of social programs. Progress is ongoing to strengthen the institutional, regulatory, and operation framework for the USR. In addition, there could be efficiency gains in improving geographic targeting in food and government cash transfer programs towards regions where poverty is higher.

30.   There is a need to reallocate benefits going to the richer segments of the population. The regressive nature of several programs, where adequacy, coverage, and beneficiary and benefits incidences tend to be better for the top quintile of the income distribution, suggest there are efficiency gains from the reallocation of benefits within the population. Thus, helping improve coverage gaps in the most vulnerable and ensuring the benefits received are more adequate.

31.   There is a need to better balance shock-response and long-term social assistance programs to reduce poverty and enhance productivity. While Niger has a relatively strong system to respond to crisis, funding of long-term assistance programs is not enough to make a dent on poverty. Moreover, based on impact evaluation, social assistance should focus on enhancing productivity and resilience by providing cash transfers which can be oriented to lasting investments and income-generating activities rather than dealing with the needs of those affected post-crisis only. They should be more productive and help to build resilience and capacity before shocks.

32.   Supporting better education outcomes, particularly for girls, would require an increase of the coverage of existing conditional cash transfer programs and complementary activities to their families. Conditional cash transfers for primary and secondary education should be

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[12] Please see Schnitzer (2019) and Premand and Schnitzer (2021) for a discussion on the effectiveness of targeting methods in addressing persistent poverty and shocks. Schnitzer (2019) find that proxy-means testing (PMT) performs more effectively in identifying persistently poor households, while Household Economy Analysis (HEA) shows superior performance in identifying transiently food insecure households. Premand and Schnitzer (2021), based on a large-scale randomized experiment, confirm that PMT is more efficient in identifying households with lower consumption per capita (poor households). PMT and a formula to identify the food-insecure (FCS) can improve the targeting and efficiency of programs than community-based targeting (CBT) which is more affected by manipulation and information imperfections.

stepped up to reduce elevated dropout rates. In addition, an extension of existing programs aimed at supporting girls' education to include more beneficiaries is needed. In addition, supplementary workshops should continue, thus contributing to educate parents and reduce incentives for early marriage.

33.   The lower coverage and adequacy of social programs and lower expenditure per capita on health and education calls for the creation of fiscal space to scale-up social spending. Strong population growth requires scaling up social spending, including through reprioritization within total spending, given Niger's lower expenditure per capita in education and health compared to peers, and very low social assistance spending. There is a need to address also other sources of low outcomes in education and health, beyond funding, by improving the quality of education and healthcare. Policies aimed at reducing informality, should help the low coverage in social insurance.

34.   Improvements of governance, public financial management and efficient public procurement are also key to achieve better education, health, and social protection outcomes. The authorities should continue to put a strong emphasis on transparency and competitive bidding in public procurement, while reinforcing the capacity of the *Cour des Comptes* to audit a very large share of government's expenditure through public procurement and fighting corruption.

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Annex 1. Regression Tables

Table 1. Niger: Determinants of the Targeting of Food Programs

Dependent: Access to food programs (Yes = 1)	(1) Poverty		(2) Hunger		(3) Shock		(4) Household		(5) All	
Poor, domestic pov. line (1 = Yes)	-0.012	(0.020)							-0.024	(0.020)
Relative poverty: against neighbors (1 = Better-off)										
Relative poverty: against neighbors (2 = Same)	**-0.033***	**(0.014)**							-0.025	(0.014)
Relative poverty: against neighbors (3 = Worse-off)	-0.017	(0.016)							-0.012	(0.017)
Relative poverty: self-assessment (1 = Richer)										
Relative poverty: self-assessment (2 = Medium)	0.054	(0.042)							0.069	(0.042)
Relative poverty: self-assessment (3 = Poor)	0.055	(0.042)							0.070	(0.043)
Relative poverty: self-assessment (4 = Very poor)	0.032	(0.044)							0.045	(0.044)
Log of consumption per adult eq.	-0.315	(0.397)							-0.335	(0.396)
Log of consumption per adult eq. squared	0.010	(0.015)							0.011	(0.015)
Do not eat healthy and nutritive food (1 = Yes)			0.012	(0.012)					0.004	(0.012)
Hunger but no food (1 = Yes)			0.010	(0.015)					0.008	(0.015)
Entire day without food (1 = Yes)			-0.009	(0.019)					-0.017	(0.020)
Family shocks (1 = Yes)					**0.031***	**(0.013)**			**0.029***	**(0.013)**
Natural shocks (1 = Yes)					**0.037****	**(0.012)**			**0.028***	**(0.012)**
Agriculture shocks (1 = Yes)					-0.008	(0.012)			-0.010	(0.012)
Non-Agri employment shocks (1 = Yes)					0.006	(0.021)			0.008	(0.022)
Conflict shocks (1 = Yes)					**0.089***	**(0.035)**			**0.088***	**(0.036)**
Other shocks (1 = Yes)					**0.044****	**(0.017)**			**0.048****	**(0.016)**
HH head disability (1 = Yes)							-0.001	(0.025)	-0.003	(0.025)
HH size							**0.004***	**(0.002)**	0.003	(0.002)
HH gender (1 = Female)							-0.004	(0.015)	-0.006	(0.015)
HH head age							0.001	(0.002)	0.001	(0.002)
HH head age squared							-0.000	(0.000)	0.000	(0.000)
HH head nationality (1 = Niger)							0.001	(0.038)	0.013	(0.038)
HH head alphabetization (1 = Yes)							0.022	(0.013)	0.023	(0.013)
HH head level of education (0 = No education)										
HH head level of education (1 = Primary)							0.001	(0.016)	0.005	(0.017)
HH head level of education (2 = Secondary)							0.000	(0.022)	0.006	(0.023)
HH head level of education (3 = Tertiary)							**-0.079****	**(0.019)**	**-0.060***	**(0.024)**
Niamey										
Agadez	**0.099****	**(0.014)**	**0.108****	**(0.013)**	**0.103****	**(0.014)**	**0.104****	(0.014)	0.000	(0.000)
Diffa	**0.232****	**(0.021)**	**0.249****	**(0.020)**	**0.216****	**(0.021)**	**0.250****	(0.020)	**0.167****	**(0.022)**
Dosso	**0.214****	**(0.019)**	**0.235****	**(0.018)**	**0.224****	**(0.018)**	**0.234****	(0.018)	**0.168****	**(0.019)**
Maradi	**0.039***	**(0.014)**	**0.063****	**(0.013)**	**0.059****	**(0.012)**	**0.065****	(0.013)	-0.000	(0.013)
Tahoua	**0.080****	**(0.013)**	**0.104****	**(0.011)**	**0.090****	**(0.012)**	**0.105****	(0.012)	**0.039***	**(0.014)**
Tillaberi	**0.096****	**(0.015)**	**0.119****	**(0.013)**	**0.110****	**(0.014)**	**0.118****	(0.013)	**0.053****	**(0.015)**
Zinder	**0.056****	**(0.015)**	**0.081****	**(0.012)**	**0.078****	**(0.011)**	**0.081****	(0.013)	0.019	(0.014)
Constant	2.347	(2.704)	0.010	(0.006)	0.002	(0.006)	-0.070	(0.061)	2.401	(2.696)
# of Households	5998		5998		5998		5998		5998	

Notes: This table presents the results for the determinants of food assistance programs using a linear probability model. In column (1), we focus on poverty criteria only, In column (2), we focus on hunger and food insecurity criteria only. In column (3), we focus on shock criteria only. In column (4), we focus on other household characteristics criteria only. In column (5), we include all the criteria. Robust standard errors are in parentheses.
*Indicates significance at 10% level, **significance at 5% level, and ***significance at 1% level.

Table 2. Niger: Determinants of the Targeting of Health Programs

Dependent: Access to health programs (Yes = 1)	(1) Poverty		(2) Hunger		(3) Shock		(4) Household		(5) All	
Poor, domestic pov. line (1 = Yes)	0.032	(0.026)							-0.011	(0.026)
Relative poverty: against neighbors (1 = Better-off)										
Relative poverty: against neighbors (2 = Same)	**-0.054***	**(0.022)**							-0.041	(0.022)
Relative poverty: against neighbors (3 = Worse-off)	-0.025	(0.026)							-0.009	(0.026)
Relative poverty: self-assessment (1 = Richer)										
Relative poverty: self-assessment (2 = Medium)	0.004	(0.096)							0.005	(0.089)
Relative poverty: self-assessment (3 = Poor)	0.027	(0.097)							0.043	(0.089)
Relative poverty: self-assessment (4 = Very poor)	0.031	(0.099)							0.052	(0.092)
Log of consumption per adult eq.	**0.872***	**(0.385)**							0.296	(0.356)
Log of consumption per adult eq. squared	**-0.035***	**(0.014)**							-0.013	(0.013)
Do not eat healthy and nutritive food (1 = Yes)			-0.023	(0.018)					**-0.036***	**(0.018)**
Hunger but no food (1 = Yes)			0.036	(0.022)					0.013	(0.021)
Entire day without food (1 = Yes)			0.005	(0.031)					-0.009	(0.030)
Family shocks (1 = Yes)					0.034	(0.019)			**0.050****	**(0.018)**
Natural shocks (1 = Yes)					**-0.034***	**(0.017)**			**-0.041***	**(0.017)**
Agriculture shocks (1 = Yes)					**0.057****	**(0.018)**			**0.044***	**(0.018)**
Non-Agri employment shocks (1 = Yes)					**0.149*****	**(0.036)**			**0.124*****	**(0.035)**
Conflict shocks (1 = Yes)					0.054	(0.048)			0.045	(0.048)
Other shocks (1 = Yes)					**0.057***	**(0.024)**			**0.056***	**(0.024)**
HH head disability (1 = Yes)							0.017	(0.038)	0.004	(0.037)
HH size							**0.024*****	**(0.003)**	**0.022*****	**(0.003)**
HH gender (1 = Female)							**-0.059***	**(0.022)**	**-0.066***	**(0.022)**
HH head age							**-0.015*****	**(0.004)**	**-0.014*****	**(0.004)**
HH head age squared							**0.000***	**(0.000)**	**0.000***	**(0.000)**
HH head nationality (1 = Niger)							-0.027	(0.066)	-0.031	(0.064)
HH head alphabetization (1 = Yes)							0.013	(0.020)	0.014	(0.020)
HH head level of education (0 = No education)										
HH head level of education (1 = Primary)							0.009	(0.028)	0.016	(0.027)
HH head level of education (2 = Secondary)							0.012	(0.033)	0.030	(0.033)
HH head level of education (3 = Tertiary)							**-0.165*****	**(0.038)**	-0.081	(0.044)
Niamey										
Agadez	**-0.120*****	**(0.029)**	**-0.072***	**(0.027)**	**-0.089*****	**(0.026)**	**-0.105*****	**(0.027)**	0.000	(0.000)
Diffa	-0.009	(0.032)	**0.061***	**(0.028)**	0.037	(0.031)	0.012	(0.029)	0.018	(0.030)
Dosso	-0.047	(0.033)	0.031	(0.029)	0.043	(0.029)	-0.014	(0.029)	0.021	(0.028)
Maradi	0.038	(0.031)	**0.115*****	**(0.027)**	**0.120*****	**(0.026)**	0.046	(0.028)	**0.067***	**(0.025)**
Tahoua	0.051	(0.032)	**0.130*****	**(0.027)**	**0.135*****	**(0.027)**	**0.086***	**(0.028)**	**0.118*****	**(0.026)**
Tillaberi	**-0.195*****	**(0.029)**	**-0.121*****	**(0.024)**	**-0.115*****	**(0.024)**	**-0.165*****	**(0.025)**	**-0.131*****	**(0.024)**
Zinder	**0.071***	**(0.030)**	**0.153*****	**(0.024)**	**0.161*****	**(0.024)**	**0.100*****	**(0.026)**	**0.133*****	**(0.025)**
Constant	**-5.114***	**(2.593)**	**0.312*****	**(0.019)**	**0.276*****	**(0.019)**	**0.723*****	**(0.107)**	-1.009	(2.388)
# of Households	5998		5998		5998		5998		5998	

Notes: This table presents the results for the determinants of health assistance programs using a linear probability model. In column (1), we focus on poverty criteria only, In column (2), we focus on hunger and food insecurity criteria only. In column (3), we focus on shock criteria only. In column (4), we focus on other household characteristics criteria only. In column (5), we include all the criteria. Robust standard errors are in parentheses. *Indicates significance at 10% level, **significance at 5% level, and ***significance at 1% level.

Table 3. Niger: Determinants of the Targeting of Government Transfers Programs

Dependent: Access to gov. transfers programs (Yes = 1)	(1) Poverty		(2) Hunger		(3) Shock		(4) Household		(5) All	
Poor, domestic pov. line (1 = Yes)	0.002	(0.005)							-0.000	(0.005)
Relative poverty: against neighbors (1 = Better-off)										
Relative poverty: against neighbors (2 = Same)	-0.001	(0.003)							-0.000	(0.003)
Relative poverty: against neighbors (3 = Worse-off)	-0.004	(0.004)							-0.002	(0.004)
Relative poverty: self-assessment (1 = Richer)										
Relative poverty: self-assessment (2 = Medium)	0.002	(0.002)							0.002	(0.002)
Relative poverty: self-assessment (3 = Poor)	**0.006***	**(0.003)**							**0.006***	**(0.003)**
Relative poverty: self-assessment (4 = Very poor)	0.014	(0.009)							0.015	(0.008)
Log of consumption per adult eq.	-0.020	(0.102)							-0.025	(0.107)
Log of consumption per adult eq. squared	0.001	(0.004)							0.001	(0.004)
Do not eat healthy and nutritive food (1 = Yes)			0.005	(0.003)					0.002	(0.003)
Hunger but no food (1 = Yes)			-0.002	(0.003)					-0.004	(0.004)
Entire day without food (1 = Yes)			-0.004	(0.003)					**-0.007***	**(0.003)**
Family shocks (1 = Yes)					0.001	(0.003)			0.001	(0.003)
Natural shocks (1 = Yes)					0.004	(0.004)			0.003	(0.003)
Agriculture shocks (1 = Yes)					0.001	(0.003)			0.001	(0.003)
Non-Agri employment shocks (1 = Yes)					0.003	(0.005)			0.002	(0.005)
Conflict shocks (1 = Yes)					**0.032****	**(0.011)**			**0.034****	**(0.011)**
Other shocks (1 = Yes)					-0.002	(0.003)			-0.003	(0.003)
HH head disability (1 = Yes)							0.000	(0.004)	0.000	(0.004)
HH size							0.001	(0.000)	0.000	(0.000)
HH gender (1 = Female)							0.007	(0.005)	0.007	(0.005)
HH head age							**0.001****	**(0.000)**	**0.001***	**(0.000)**
HH head age squared							**-0.000****	**(0.000)**	**-0.000****	**(0.000)**
HH head nationality (1 = Niger)							-0.010	(0.014)	-0.008	(0.014)
HH head alphabetization (1 = Yes)							-0.001	(0.003)	-0.001	(0.003)
HH head level of education (0 = No education)										
HH head level of education (1 = Primary)							-0.001	(0.004)	-0.000	(0.004)
HH head level of education (2 = Secondary)							0.001	(0.005)	0.003	(0.004)
HH head level of education (3 = Tertiary)							-0.004	(0.003)	0.003	(0.003)
Niamey										
Agadez	-0.001	(0.004)	-0.000	(0.004)	0.000	(0.004)	0.001	(0.004)	0.000	(0.000)
Diffa	**0.040*****	**(0.010)**	**0.043*****	**(0.010)**	**0.034*****	**(0.008)**	**0.044*****	**(0.010)**	**0.031*****	**(0.008)**
Dosso	**-0.008***	**(0.004)**	-0.004	(0.003)	-0.005	(0.003)	-0.003	(0.003)	**-0.009****	**(0.003)**
Maradi	-0.003	(0.004)	0.002	(0.004)	0.003	(0.004)	0.004	(0.004)	-0.001	(0.004)
Tahoua	0.000	(0.005)	0.004	(0.005)	0.003	(0.006)	0.004	(0.005)	-0.001	(0.004)
Tillaberi	**-0.007***	**(0.003)**	-0.005	(0.002)	-0.006	(0.003)	-0.004	(0.003)	**-0.007***	**(0.003)**
Zinder	-0.001	(0.005)	0.004	(0.004)	0.005	(0.004)	0.006	(0.004)	0.000	(0.005)
Constant	0.152	(0.693)	0.003	(0.002)	0.003	(0.002)	-0.019	(0.021)	0.164	(0.737)
# of Households	5998		5998		5998		5998		5998	

Notes: This table presents the results for the determinants of government transfers programs using a linear probability model. In column (1), we focus on poverty criteria only, In column (2), we focus on hunger and food insecurity criteria only. In column (3), we focus on shock criteria only. In column (4), we focus on other household characteristics criteria only. In column (5), we include all the criteria. Robust standard errors are in parentheses. *Indicates significance at 10% level, **significance at 5% level, and ***significance at 1% level.

MACROECONOMIC GAINS FROM CLOSING GENDER EDUCATIONAL GAPS IN NIGER[1]

This paper explores the state of gender equality and education attainment of girls in Niger. It also estimates the macroeconomic gains from reducing gaps in education between boys and girls using a micro-founded general equilibrium model. The analysis shows that Niger has made some progress toward higher educational attainment for girls, but the country still lags far behind other sub-Saharan African countries. The results from the general equilibrium model suggest that closing the gender gaps in education would boost female labor participation, increase income earned by women and improve fiscal outcomes. More importantly, closing the gender gap in years of schooling in each income percentile would boost long-term GDP by 11 percent. These significant economic gains from investing in girls' education will contribute to the achievements of the strategic goals defined under the Programme de Développement Economique et Social (PDES) 2022-26.

A. Introduction

1.   Gender equality tends to have a positive impact on governance, stability, and macroeconomic outcomes. There is growing evidence that gender equality is associated with better macroeconomic outcomes at all levels of development, including higher GDP, greater productivity, lower income inequality, and faster economic growth and convergence (IMF 2015, Gonzales and others 2015; Sever, 2022). Lower gender gaps in education and higher female labor force participation have been associated with higher diversification of output and exports, which in turn support economic resilience (Kazandjian and others, 2016). Women are more likely to invest more of their resources into their children, which in turn yields greater school expenditures and higher school enrollment for children (Aguirre and others 2012). Other studies have shown that gender gaps contribute to instability and fragility, and poor governance (Caprioli, 2005; Branisa and others, 2013).

2.   Cognizant of the importance of gender equality, the Nigerien authorities have placed strategies to close gender gaps at the heart of the new development plan. They adopted a new National Gender Policy aiming by 2027 to build, with all the stakeholders, a country without discrimination, where men and women, girls and boys have the same opportunities to participate in its development and enjoy the benefits of its growth. Female education is a major priority as the authorities plan to build 100 boarding schools for girls by 2025 and close the gender gaps in primary and secondary education enrollment by 2026 (Table 1).

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[1] Prepared By Rasmane Ouedraogo (Resident Representative) and Diego Gomes (SPR).

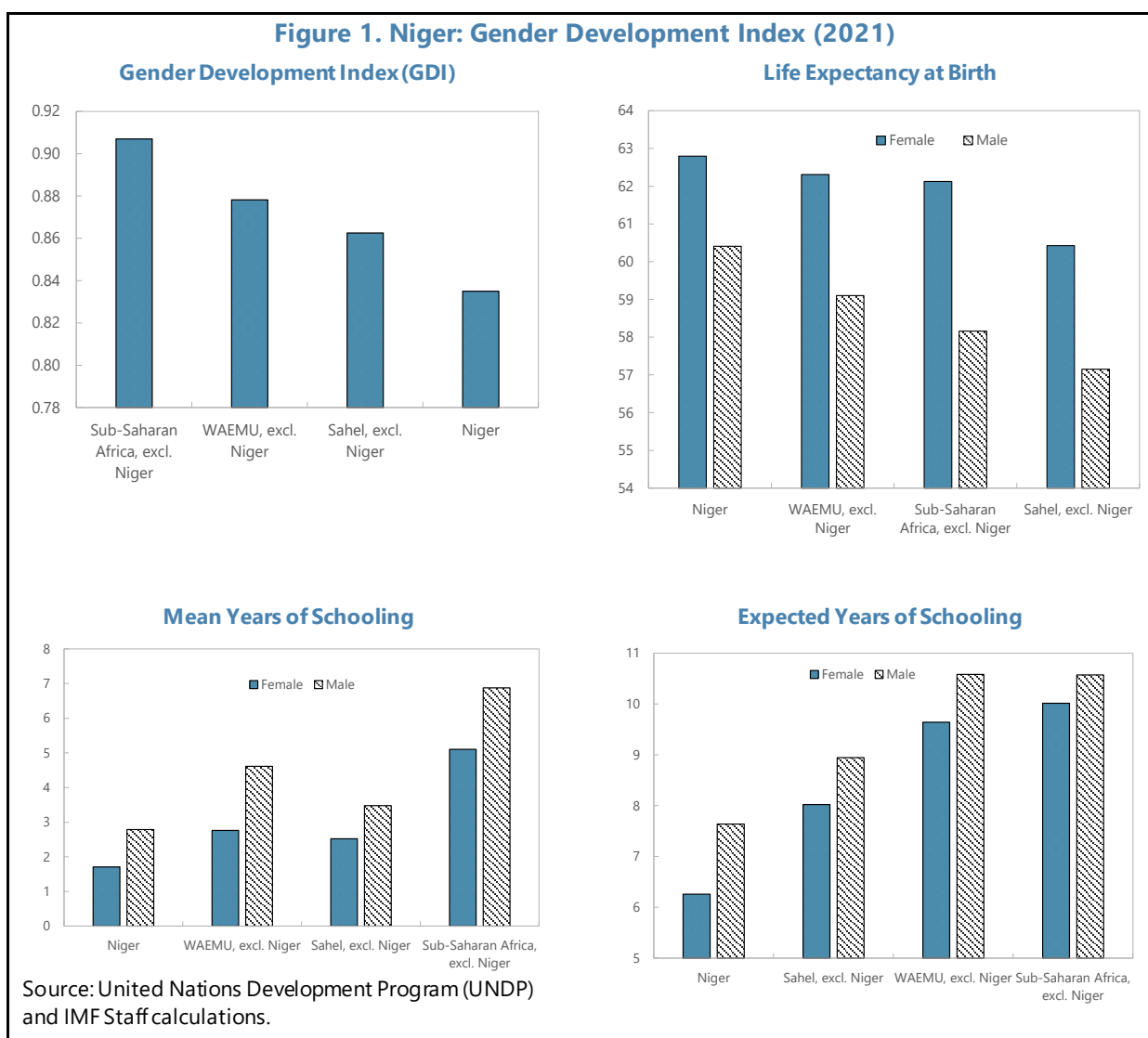| Table 1. Niger: Projected Gender Indicators Under the PDES 2022-26								
	Reference year	Reference index	2022	2023	2024	2025	2026	Difference (end-period-reference year), in %
Girls/boys parity index: gross primary enrollment rate	2020-21	0.87	0.94	0.96	0.98	1	1	14.9
Girls/boys parity index: gross secondary lower school enrollment rate	2018-2019	0.83	0.9	0.92	0.94	0.96	1	20.5
Girls/boys parity index: gross secondary higher school enrollment rate	2018-2019	0.6	0.8	0.85	0.9	1	1	66.7
Share of girls enrolled in industrial sector trainings (%)	2017-2018	17.85	18.2	18.5	18.8	19.1	19.4	8.7
Gender inequality index (UNDP)	2019	0.642	0.627	0.622	0.616	0.611	0.606	-5.6
Gender development index (UNDP)	2019	0.724	0.745	0.754	0.763	0.77	0.778	7.5
Child mariage rate (%)	2021	64.9	57.92	50.94	43.96	36.98	30	-53.8
Gender score, Mo Ibrahim	2019	47.5	47.9	48.2	48.6	48.9	50.4	6.1
Female activity rate (%)	2020	60.6	63.3	63.9	66	69	72	18.8
Share of businesses run by women (%)	2021	18	20	22	24	26	28	55.6
Share of women ministers (%)	2021	15.15	17.6	20.6	29.4	32.4	32.4	113.9
Share of women in senior positions (%)	2020	19.13	21.2	27	29	30	30	56.8
Share of gender-sensitive investment projects and programs (%)	2019	35.5	40	45	47	50	55	54.9
Share of gender units producing annual reports on gender analysis (%)	2021	0	50	100	100	100	100	

Source: Niger's authorities and IMF Staff calculations

3.   Against this background, this paper examines the state of gender development and estimates the macroeconomic gains from implementing policies to promote gender equality in Niger. First, the level of gender development and education attainment are benchmarked against three groups of countries, namely sub-Saharan Africa, the WAEMU, and the Sahel r. Second, a simulation is performed on the economic, social, and financial benefits of closing gender gaps in education using a micro-founded general equilibrium model. Finally, we provide an overview of ongoing government initiatives and policy recommendations.

B.   Stylized Facts

4.   Gender development in Niger stands out as one of the lowest in sub-Saharan Africa. The United Nations Gender Development Index (GDI) measures gender inequalities in achievement in three basic dimensions of human development: i) *health*, measured by female and male life expectancy at birth; ii) children's *education*, measured by female and male expected years of schooling for children; iii) *adult education* measured by female and male mean years of schooling for adults ages 25 years and older. It shows that, when aggregating these categories, Niger performs worse than the average in Sub-Saharan Africa, WAEMU countries, or even the peers in the Sahel region (Figure 1, Panel A).

5.   This underperformance is due to lower education attainment in Niger. Looking at the different components of the GDI, Figure 1 shows that Niger performs well in terms of life expectancy at birth compared to peers but is behind on education indicators. The average year of schooling is only 1.7 and 2.8 for females and males in Niger, respectively, against 5.1 and 6.9 years in sub-Saharan Africa and 2.5 and 4.6 years in the WAEMU region. The disparities are also large when it comes to the expected years of schooling, which measures the number of years of schooling that a child of school entrance age can expect to receive if the current age-specific enrollment rates persist throughout the child's life.

Figure 1. Niger: Gender Development Index (2021)

Source: United Nations Development Program (UNDP) and IMF Staff calculations.

6.   Girls' elevated school drop-out and child marriage rates are significant constraints to gender equality. At 3.8 percent of GDP in 2020, government spending on education is commendable (Figure 2). While slightly below the WAEMU average of around 4 percent of GDP, Niger's education spending is above the average in sub-Saharan Africa (3.4 percent of GDP) and the Sahel region (3.5 percent of GDP). However, this relatively high education spending is poorly translated into better education outcomes for women due to elevated school drop-out and early child marriage rates. Figure 2 shows that around 45 percent of girls drop-out of primary school in Niger, compared to 20 percent in the WAEMU region and 22 percent in Sub-Saharan Africa. In addition, more than 75 percent of women get married by age 18 in Niger, against 35 percent for the peers in the WAEMU region and 41 percent in sub-Saharan Africa.

7.   As a consequence, Nigerien women are more likely to work in unpaid and vulnerable jobs. Although the ratio of female to male labor force participation is better in Niger than the average in the Sahel region, Niger lags significantly behind its peers in terms of share of wage and

salaried female workers, and vulnerable employment (Figure 2). At 1.8 percent, the share of wage and salaried female workers is 10 and 9 times less than the average in Sub-Saharan Africa and the WAEMU region, respectively. Conversely, the share of vulnerable employment (mostly unpaid family workers and own-account workers) for women is very high in Niger (around 98 percent) compared to its peers (80 percent in sub-Saharan Africa and 84 percent in the WAEMU region).

Figure 2. Niger: Education and Employment Outcomes (2021 or the latest)

Government Expenditure on Education, Total (Percent of GDP)

Children out of School, Female (Percentage of Female Primary School Age)

Women who were First Married by Age 18 (Percentage of Women Ages 20-24)

Ratio of Female to Male Labor Force Participation Rate (Percent)

Wage and Salaried Workers, Female (Percentage of Female Employment)

Vulnerable Employment, Female (Percentage of Female Employment)

Source: World Bank's World Development Indicators, ILO and IMF Staff calculations

8.   However, there are encouraging signs for Nigerien women that both the Gender Development Indicator and the Gender Parity Index of school enrollment have been improving (Figure 3). The Gender Development Index has increased by over 15 percent between 2000 and 2021. Gaps in school enrollment have also been shrinking but challenges remain, particularly on tertiary education. Over the past two decades, the Gender Parity Index in primary education enrollment has improved by around 30 percent, against 24 percent for secondary education enrollment. These improvements stem from the free education until adopted in 2011 and the adoption of the gender strategy in 2009 to boost girls' education. While the Gender Parity Index in tertiary education enrollment has recorded the strongest increase (65 percent), it remains very low compared to the indices of primary and secondary education.
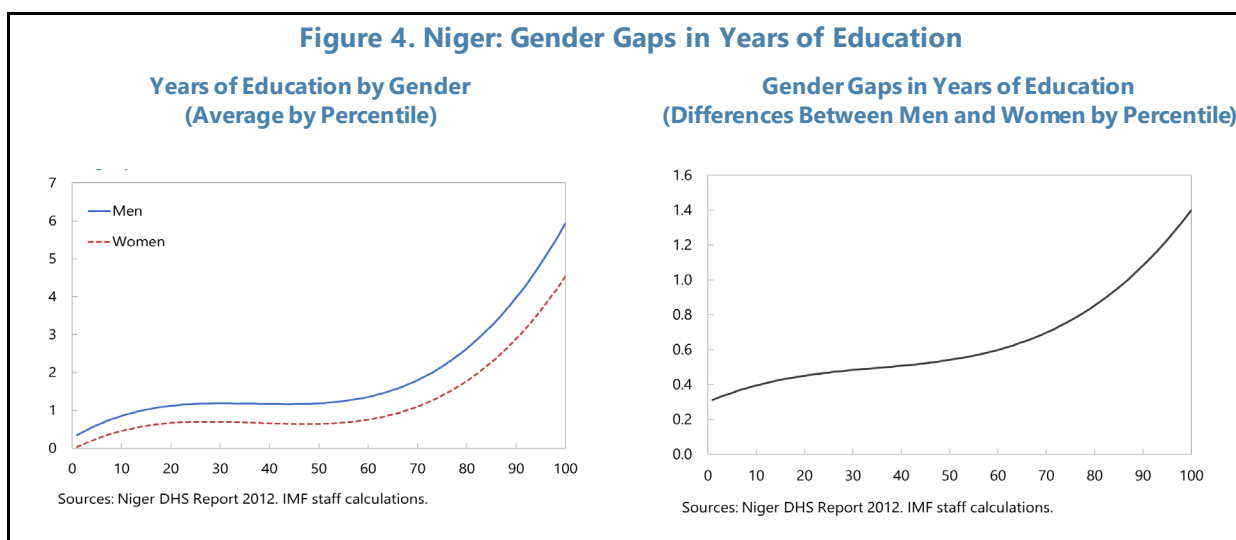

Figure 3. Niger: Trends in Gender Development Index and School Enrollment

Source: UNDP, World Bank's World Development Indicators
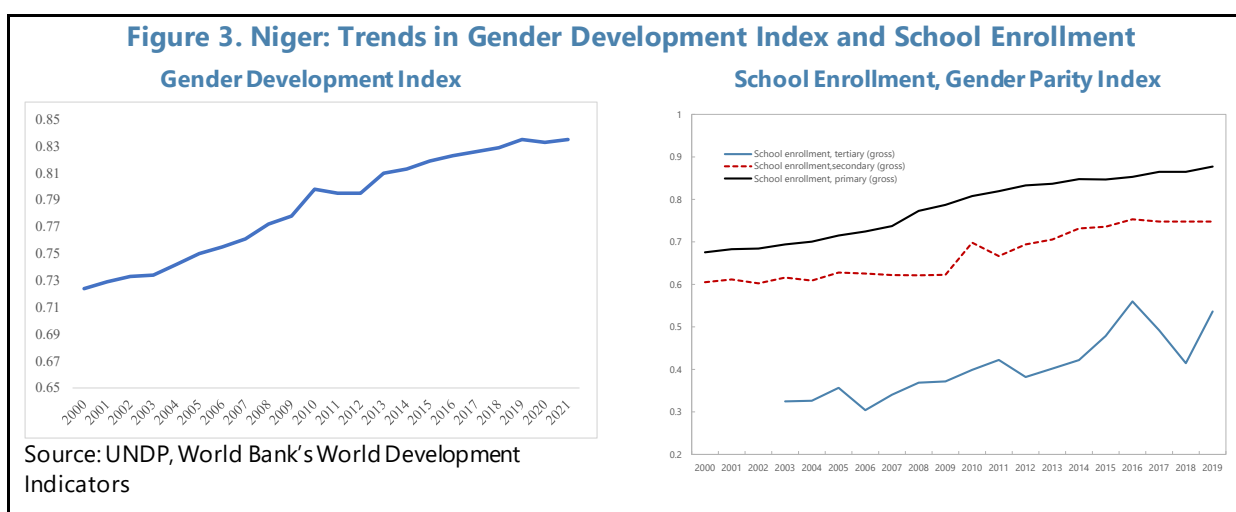
C.   Macroeconomic Gains of Reducing Gender Gaps in Education

9.   The aforementioned gender disparities in education undoubtedly pose significant development challenges and have macroeconomic implications. In this section we quantify the impact of closing education gaps between girls and boys in a microfounded, lifecycle, dynamic general equilibrium model, in which individuals differ by gender, skills, age, and access to financial markets. This framework has been applied to previous IMF country work in several EMDEs, including Argentina (IMF, 2017), Iran (IMF, 2018), Nigeria (IMF, 2019a), Lao P.D.R. (IMF, 2019b), Senegal (Malta, Martinez, and Tavares, 2019), and Kenya (IMF, 2021). We calibrate the model to match key variables of Niger's economy in 2018, such as the formal sector's share of GDP, government expenditures as a percentage of GDP, government expenditures on education as a percentage of GDP, the Gini index of household income, and female labor force participation rate, among others. We considered 2018 as the benchmark year due to the availability of microdata for Niger, notably from the 2018 vintage of the *Enquête Harmonisée sur le Conditions de Vie des Ménages.*

10.   A full and technical description of the model can be found in Malta, Martinez, and Tavares (2019), but here we briefly describe its main features. In each life period, households (comprised of a man and a woman) make decisions about the consumption of goods and services produced in formal and informal sectors, while decisions on labor supply are made separately by men and women. Men decide the number of hours worked in the formal and/or informal sectors, while women decide first if they participate to labor market and, if they do, how many hours to work in the formal and/or informal sectors. Households incur a utility cost when women participate in the labor market. This cost comes from the need to coordinate multiple household activities (for example, home production, child/elderly care, and other unpaid work) as well as comply with laws and social norms that create barriers for women to work outside the household. Everyone has a human capital that is determined by their initial skills and years of education but also evolves endogenously through on-the-job experience. Production in the formal sector uses capital and labor as inputs, while the informal sector production uses only labor. Women suffer wage discrimination when working in any of the sectors (they receive a lower wage for hour worked). Households pay taxes on the goods and services purchased from the formal sector, and on the income earned from working in the formal sector. Corporate revenues in the formal sector are taxed as well. The government collects taxes on formal consumption, formal labor income, and formal corporate revenues, and spends them on public consumption, public education, and transfers.

11.   We simulate a public policy that increases education spending to include more girls in schools so that the number of years of education of boys and girls within the same income percentile is equalized. This is motivated by the fact that in Niger, despite having a very low overall level of education, men have more years of education than women at every income percentile (Figure 4, Panel A). These differences, on average, range from slightly more than 0.3 additional years for men at the lower end of the distribution to roughly 1.4 additional years at the upper end (Figure 4, Panel B). Also, the gender gap in educational attainment grows monotonically across the income spectrum, suggesting that gender inequality in human capital formation rises with income.

Figure 4. Niger: Gender Gaps in Years of Education

Years of Education by Gender
(Average by Percentile)

Gender Gaps in Years of Education
(Differences Between Men and Women by Percentile)

Sources: Niger DHS Report 2012. IMF staff calculations.

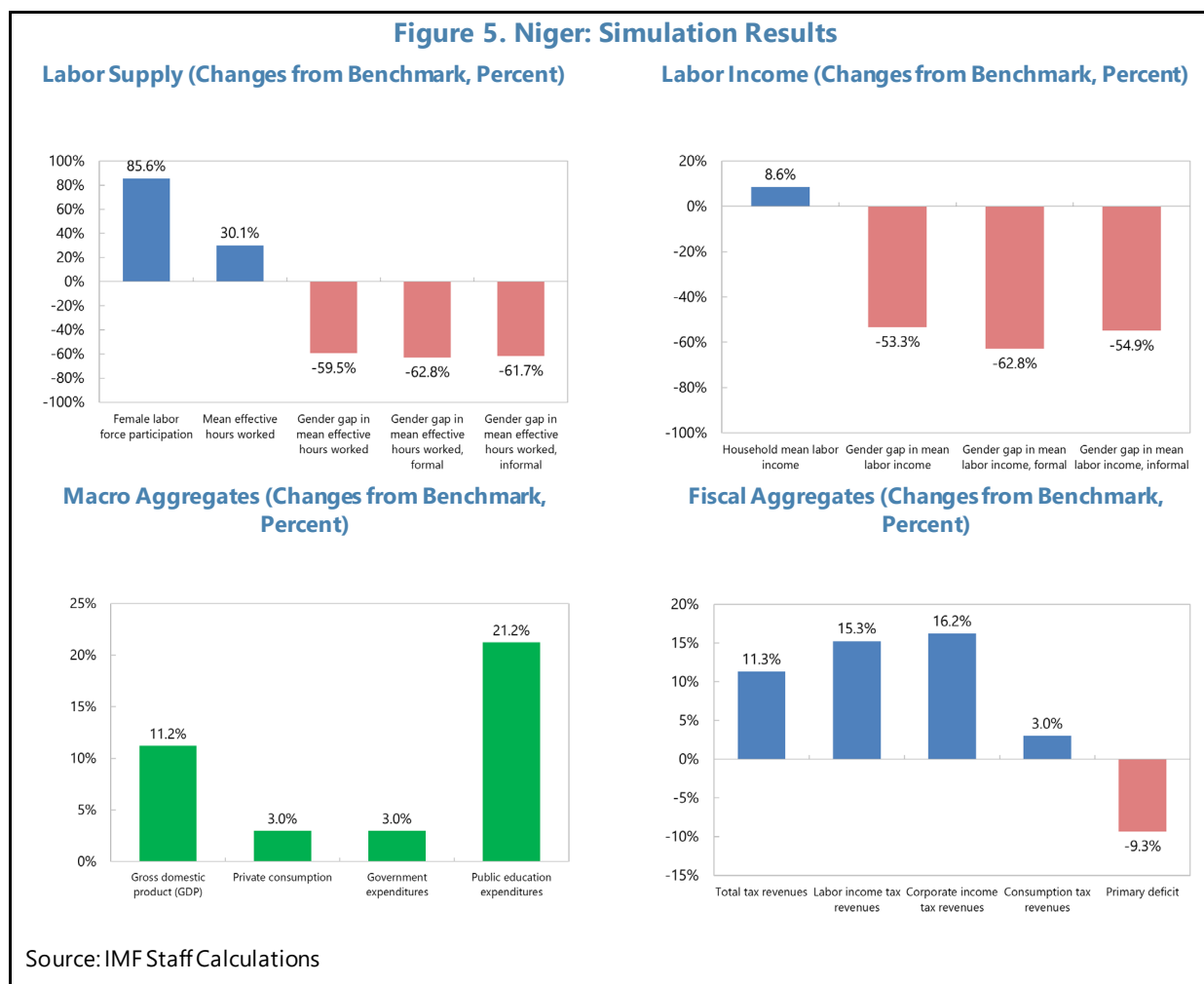Sources: Niger DHS Report 2012. IMF staff calculations.

12.   Raising girls' education to the same level as boys' triggers a series of positive effects on the economy. The main findings of the policy simulation are presented in Figure 5. Women enter adulthood with more education and thus a larger stock of human capital. As a result, they benefit from higher labor-market returns to education as well as higher returns to experience if they choose to work. Therefore, the incentives for women to enter the labor force and work more hours increase. According to the model, the new policy is expected to increase female labor force participation by 85.6 percent (Figure 5, Panel A).[2] Working women begin to supply more hours to the labor market, which, combined with their higher level of human capital, increases mean effective hours worked by 30.1 percent.[3] The overall gender gap in mean effective hours worked, as measured by the male-to-female ratio, goes down by 59.5 percent. The same is true for the hours gender gaps in formal and informal labor markets, which have shrunk by 62.8 and 61.7 percent, respectively. Working women are better compensated in the labor market due to their higher level of human capital and higher supply of work hours, which contributes to increased household income and closing the income gap between men and women. Household mean labor income goes up by 8.6 percent, and the overall gender gap in mean labor income, as measured by the male-to-female ratio, goes down by 53.3 percent (Figure 5, Panel B). The same is observed individually in the formal and informal labor markets, with gap reductions of 62.8 and 54.9 percent, respectively.

13.   These labor market developments have macroeconomic and fiscal implications. Total economic output, as measured by GDP, rises by 11.2 percent, owing primarily to the increase in effective hours worked (Figure 5, Panel C). Higher labor income enables households to consume more, resulting in a 3% increase in aggregate private consumption. On the other hand, to implement the new education policy, the government must increase its public education spending by 21.2 percent, raising total government spending by 3 percent. Such increase in education spending would imply budget reallocation and efficiency improvement. However, increased labor income, consumption, and production result in increased tax collection, which can be used to fund these additional fiscal outlays. Revenues from taxes on labor income, corporate income, and consumption grow by 15.3, 16.2, and 3 percent, respectively (Figure 5, Panel D). As a result, total tax revenue increases by 11.3 percent, providing more than enough resources to cover the new education expenditures, implying a 9.3 percent reduction in the primary deficit.

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[2] The sharp increase in female labor force participation is due to Niger's extremely low level of human capital combined with the model's embedded human capital theory. The model assumes that the initial stock of human capital is concave in years of education. As a result, when human capital levels are low, additional levels of education produce significantly greater human capital changes than when human capital levels are high. Then, through the lens of the model, these changes create a significant incentive for women to participate due to the significant increase in labor market returns from human capital.

[3] Effective hours worked are regular hours worked adjusted for human capital levels. This is the relevant labor input concept for assessing variations in production.

Figure 5. Niger: Simulation Results

Labor Supply (Changes from Benchmark, Percent)

Labor Income (Changes from Benchmark, Percent)

Macro Aggregates (Changes from Benchmark, Percent)

Fiscal Aggregates (Changes from Benchmark, Percent)

Source: IMF Staff Calculations

D. Policy Recommendations

14. **This paper has shown that reducing gender inequality in education could boost economic growth in Niger.** Therefore, addressing gender inequity in the country is not only compelling for social reasons, but it also makes economic sense. As the new National Development Plan is being rolled out, the authorities of Niger should accelerate the implementation of ongoing and envisaged projects and strategies to improve educational attainment for girls, especially by:

- **Building adequate school infrastructure**. The major government initiative in this area is the construction of boarding school for girls, with the goal of building 100 schools by 2025. Given the strong commitments from partners following the pledges at the Education Summit in New York in September 2022, the government should enhance its absorptive capacity through good governance and aid management capacity building measures to ensure that the financial resources are disbursed on a timely manner.

- **Designing investments to improve the quality of education**: another major government initiative is to replace the 36,000 classrooms made of precarious materials with solid materials

and strengthen its permanent teaching staff. These two projects will help improve access to education and teaching quality. Given the relatively high costs of the two projects, an improvement in the efficiency of education spending and budget reallocation will be needed. [4]

- **Putting in place programs to keep girls in school**: while the boarding schools for girls aim to keep girls longer in school, the envisaged 100 schools will not be enough to enroll all school-age girls and cover the entire national territory. Other interventions could be designed to reduce the opportunity and out-of-pocket costs of girls' education through cash transfers. Providing targeted financial incentives to girls or families directly would help delay age at marriage and also enable girls who dropped out to return to school.

15.   **Emphasis should also be placed on policies to expand economic opportunities for girls**. Under the National Development Plan, the authorities committed to empower and strengthen women's access to the labor market and resilience to shocks by (i) creating decent and sustainable job opportunities for women and young girls; (ii) strengthening the skills of women and young girls; (iii) providing support for the improvement of working conditions in the informal sector where women and young girls are strongly represented; (iv) promoting female entrepreneurship in all sectors of activity. The focus to provide employment opportunities could help increase earnings for women as well as savings, and therefore provides incentives for parents to send their girls to school. In addition, the Government will ensure compliance with elective and nominative quotas and will take measures to improve the regulatory and legal framework for preventing and responding to gender-based violence. Specific measures and programs need to be adopted to implement these commitments.

16.   **To increase accountability and effectiveness of the programs to improve gender equality, the authorities could consider adopting gender-responsive budgeting.** Gender budgeting is an important mechanism for ensuring accountability in how gender policy commitments are translated into the national budget. It provides the basis for more evidence-based decision-making – vital for ensuring that public finances are effectively used to meet real needs, bridge current gaps and curb continued inequalities.

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[4] For more information on policies to improve the efficiency of education spending, see the selected issues paper on the efficiency of social spending in Niger.

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FINANCIAL INCLUSION IN NIGER: CHALLENGES AND OPPORTUNITIES [1]

Financial inclusion can increase economic growth and productivity and reduce poverty and inequality by helping people and firms—particularly SMEs—to save and invest, smooth consumption, and better manage financial risks. This paper highlights Niger's lag compared to other WAEMU countries in terms of access to and use of formal financial services, including for women and youth, and underscores key demand and supply side challenges to financial inclusion as well as structural impediments. It lays out key priorities for Niger to harness the potential of greater financial inclusion to support the country's development agenda, including efforts to tackle low financial literacy, promote digitization, and address informality.

A.   Benchmarking Niger Against Regional Peers

1.   Niger is lagging far behind the rest of the WAEMU in terms of financial inclusion (Figure 1). According to BCEAO data, as of December 2021, the use of financial services (in the form of banking, microfinance, or e-money) stood at only 14 percent of the population in Niger, lagging far behind Mali, which is the closest WAEMU member state regarding this metric, with a rate of 55 percent. In the leading countries of the union, Benin and Togo, about 86 percent of the population use financial services. At the WAEMU level (including all member states), the overall use of financial services amounted to 67 percent of the population at the end of 2021.

Box 1. Niger: Concepts[1]

Financial inclusion. It is a multidimensional concept and can broadly be defined as the extent to which individuals and firms have access to, and effectively use, formal financial services at high quality and low costs. Banking sector, Micro Finance Institutions (MFIs) and e-money are three important aspects of inclusive finance.

The MFI sector. It consists of financial institutions that provide financial services mainly to low-income households and small- or micro-sized enterprises, which are typically excluded from traditional banking services.

Mobile money and e-money. Mobile money can be defined as financial services offered by mobile network operators or other financial institutions which partner with network operators, generally without the requirement of having a bank account. Hence, the pre-requisite is often to have a mobile phone subscription. E-money is a broader concept that also covers other digital financial services (DFS) such as services provided by banks or other traditional financial institutions that can be done using mobile phone, internet, or other electronic devices (e.g., deposits, bill payments, or online transfers).

[1] Box 1 is adopted from the IMF WAEMU Staff Report published on March 2022 (IMF Country Report No. 22/67).

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[1] Prepared By Yoro Diallo, Arsène Kaho, and Can Sever. Canghao Chen (AFR) assisted with the formatting of the charts.

2.   **Niger also lags the rest of the WAEMU regarding the pace of change of financial inclusion (Figure 1).** The country showed some improvements during the period of 2010-2015 with a rise in the overall use of financial services to 17 percent of the population by end-2015, from 7 percent at the end of 2010. However, this progress came to a halt and was even reversed to 14 percent by the end of 2021. In contrast, suring the same period (2015-2021), the share of the population using financial services in the WAEMU region increased significantly, from 42 percent of the population by end-2015 to 67 percent at the end of 2021.

3.   **In particular, the MFI sector has experienced a significant contraction in recent years (Figure 1).** The use of banking services increased only from 2 percent to 7 percent of the population in Niger from end-2010 to end-2021, while the other WAEMU countries showed steady progress from 9 percent of the population to 19 percent during the period. Regarding the use of MFI loans, it rose from 6 percent of the population in 2010 to 11 percent in 2015 but lowered to 5 percent at the end of 2021. This reversal, which was not offset by other pillars of financial inclusion, mostly explains the decline in the overall use of financial services in Niger during the 2015-2021 period.
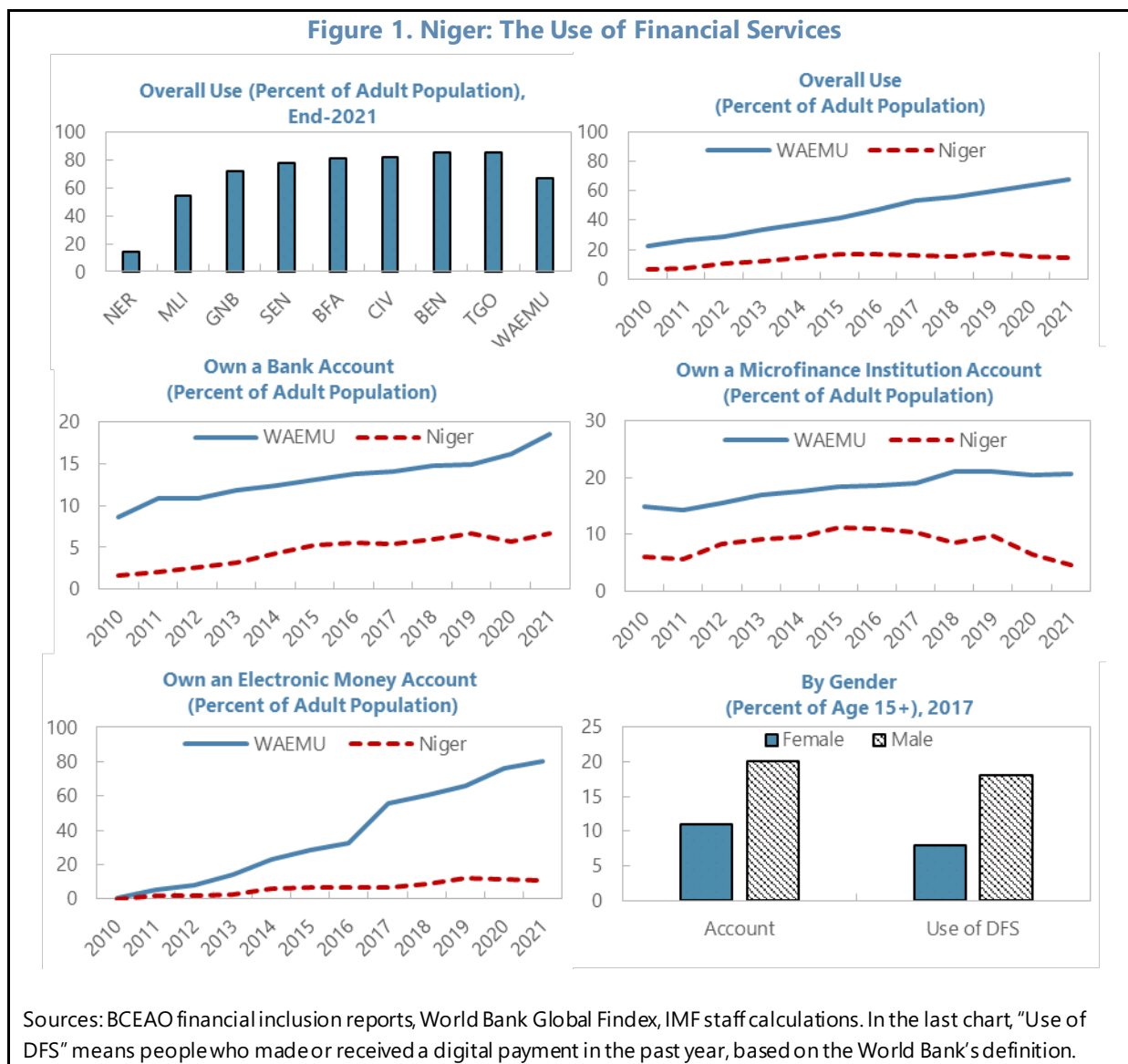
4.   **However, the largest divergence between Niger and the WAEMU appears in the use of e-money (Figure 1).** The number of e-money accounts was lower than 1 percent of the population in both Niger and in the WAEMU, as of end-2010. However, the region, excluding Niger, displayed a remarkable improvement since then. By the end of 2021, about 80 percent of other WAEMU countries' population was able to get access to e-money services compared to only 11 percent in Niger. While the relatively high level of the use of e-money and fast progress in that respect provide a window of opportunity for the WAEMU countries to leapfrog in financial inclusion and catch up with more developed countries, this potential remains untapped in Niger so far.

5.   **Gender gaps in the use of financial services are also prevalent in Niger.** According to World Bank data, the share of women with some sort of account was only 11 percent of the women's population, while this ratio was 20 percent for males (Figure 1). A similar gap is likewise apparent for the people who made or received a digital payment—8 percent for females compared to 18 percent for males. Nevertheless, it is worth noting that such large gaps are not specific to Niger, other WAEMU member states exhibiting similar gender gaps in financial inclusion.[2] On the positive side, these suggest that bridging the gender gap in financial inclusion provides a window of opportunity for Niger to make the much-needed progress in overall financial inclusion and catch up with the rest of the WAEMU.

6.   **Geographical indicators of financial inclusion also point to a large divide between Niger and the rest of the WAEMU (Figure 2).** Service points—defined as any type of physical place where clients can receive financial services—in the WAEMU increased tremendously from around 3 (per 1,000 km^2) at end-2010, to 307 at end-2021, thanks to the spike in e-money service

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[2] Based on the World Bank data, in 2017, account ownership rates for females and males were 38 versus 47 percent for Senegal, 38 versus 53 percent for Togo, respectively. Regarding the use of financial services for females and males, the ratios stood at 36 versus 44 percent for Senegal, 23 versus 40 percent for Togo, respectively.

points. However, this development is not observed in the case of Niger, which still presented only 18 service points at the end of 2021.

Figure 1. Niger: The Use of Financial Services

Sources: BCEAO financial inclusion reports, World Bank Global Findex, IMF staff calculations. In the last chart, "Use of DFS" means people who made or received a digital payment in the past year, based on the World Bank's definition.

7.   Bank loans to the private sector remain low in Niger, and there are larger vulnerabilities in the banking sector compared to the rest of the WAEMU (Figure 3). Bank credit to the private sector amounted to 13 percent of GDP in Niger as of end-2021, almost half of the regional average (24 percent). This also reflects the sluggish progress in financial deepening since 2010. In addition, banks' portfolio continued to be riskier in Niger than in other countries in the region since 2010 and further deteriorated at the end of 2021, as gross NPLs ratios in the Niger banking sector were twice that of the region (21 percent versus 10 percent). The weak portfolio quality of the Nigerien banking sector threatens financial inclusion going forward, heightening particularly the risk of availability of credit for SMEs.

Figure 2. Niger: The Service Points
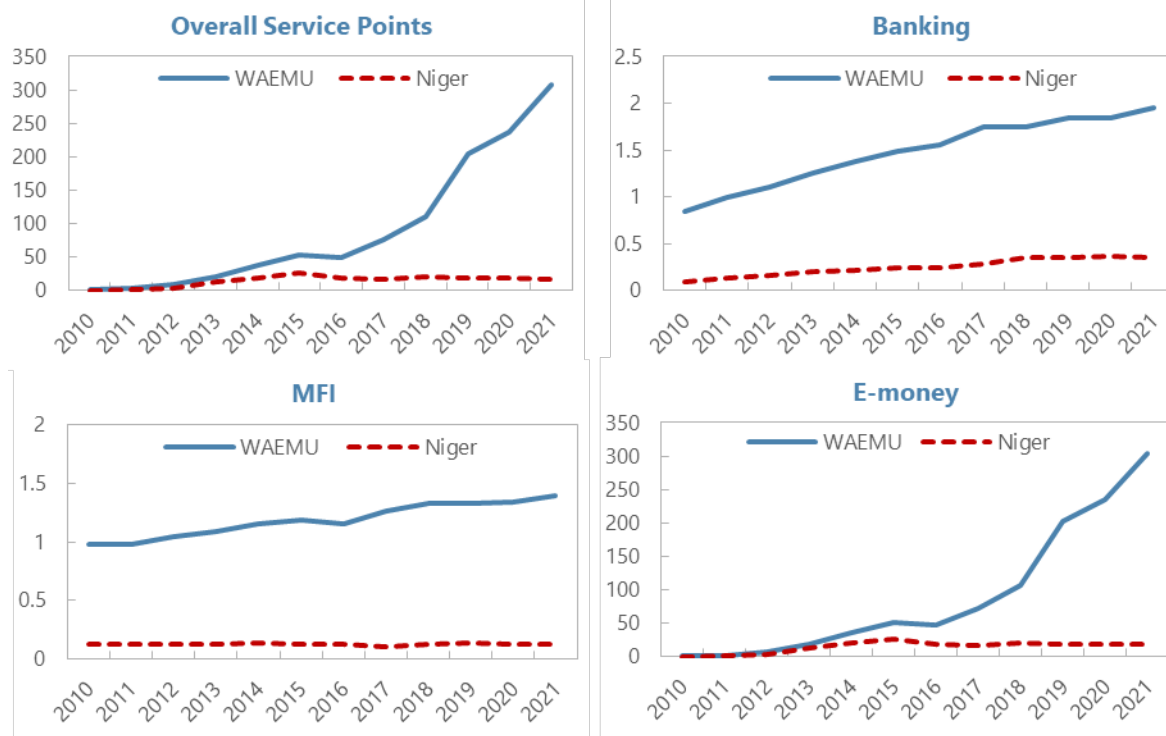
Source: BCEAO financial inclusion reports, IMF staff calculations. Service points are the number of physical places (at 1000km^2) to receive the corresponding financial service.

8.   The MFI sector, an important pillar of financial inclusion in the WAEMU, also presents a smaller volume of loans in Niger but with elevated risks relative to the regional average (Figure 3). In other WAEMU countries, loans by MFIs almost doubled since 2010 from 1.1 percent of GDP to 2 percent. In contrast, the sector shrank in Niger by almost 50 percent, from 0.5 percent of GDP in 2015 to about 0.2 percent at end-2021. Moreover, the portfolio of the MFI sector remains much riskier in Niger, as NPLs were about twice the regional average before Covid-19, with this gap widening since the pandemic. During the health crisis in 2020, the BCEAO's measures to protect financial inclusion helped the MFIs in the region maintain a stable NPL ratio (Box 2), but the effectiveness of these measures in Niger was limited and NPLs continued to increase at a rapid pace. At end-2021, the NPLs ratio in Niger stood at 40 percent, as opposed to 8 percent at the WAEMU level. This vulnerability in the MFI sector poses a bottleneck and a threat to financial inclusion in Niger going forward.

Figure 3. Niger: Banking Sector and MFIs

MFI Credit (Percent of GDP)

MFI NPL Ratio (Percent)
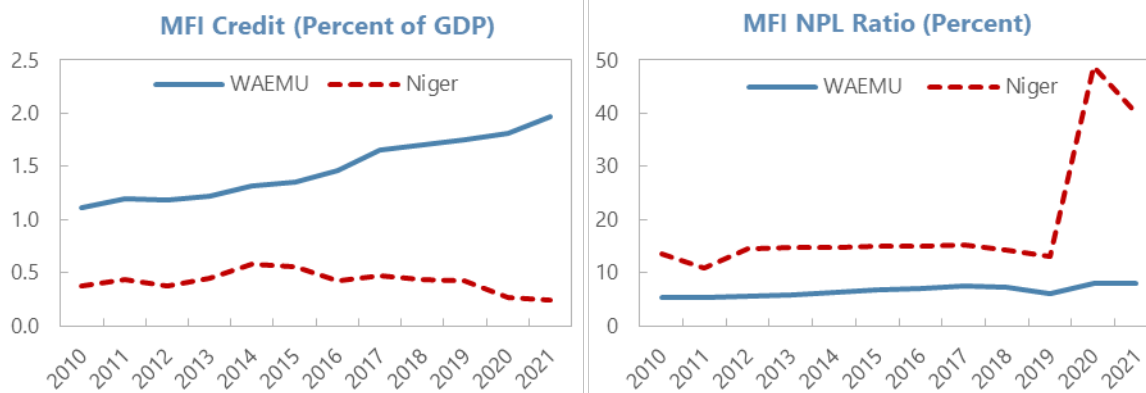
Source: BCEAO MFI reports, BCEAO monthly bulletins, BCEAO financial soundness indicators, IMF staff calculations. Charts show end-year values. MFI sector NPL ratio is interpolated during 2013-2016, since the data is missing. Bank loans to the private sector and MFI loans (outstanding amounts) are reported.
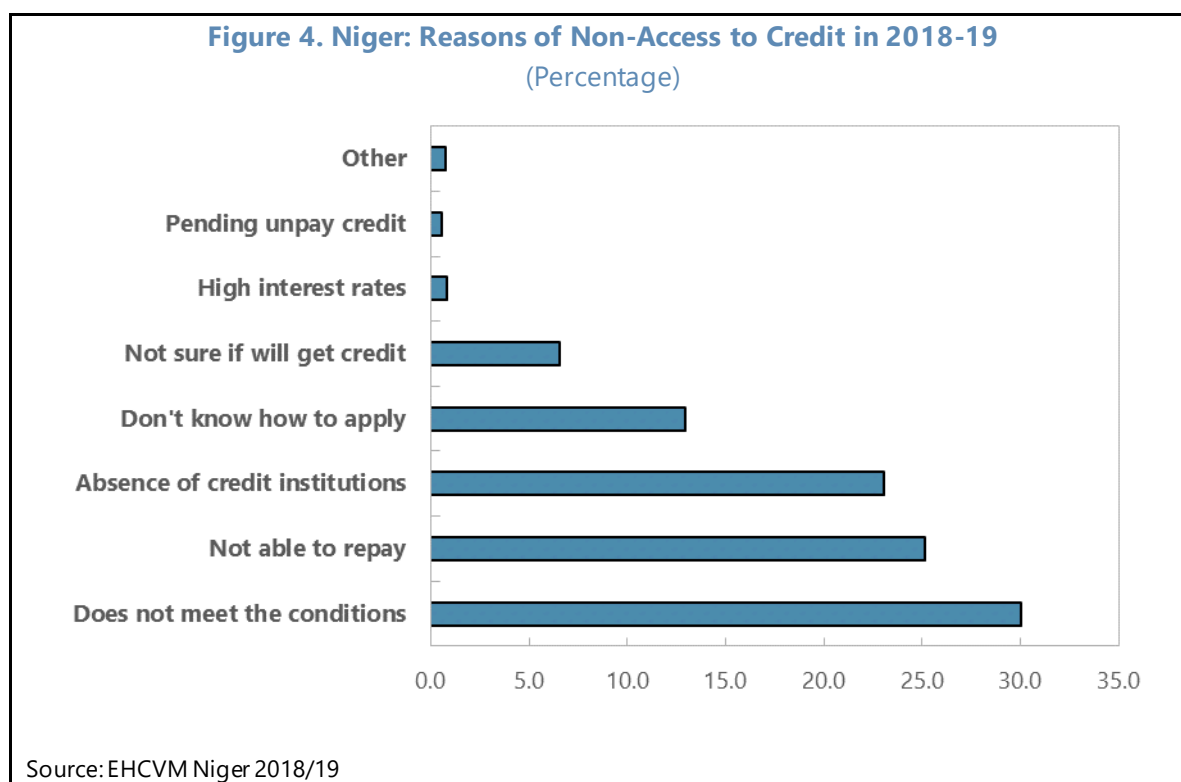

Box 2. Niger: BCEAO's Actions to Protect Financial Inclusion During the Pandemic[1]

The BCEAO has taken actions to protect financial inclusion, as the pandemic hit the region. In order to incentivize the use of e-money, the BCEAO reduced fees and commissions in various types of e-money transactions and relaxed the conditions for opening e-money accounts.

In addition, the BCEAO launched a framework in 2020 encouraging banks and MFIs to postpone the debt repayments of customers that were affected by the pandemic (but evaluated as solvent), without reclassifying those claims as non-performing. This regulatory forbearance framework provided breathing space to firms and households hit by the economic downturn and supported the goal of an inclusive financial system. Furthermore, in order to facilitate MFI access to bank financing, bank loans granted to eligible MFIs became eligible, as collateral, for a special refinancing window of the BCEAO (thereby creating additional incentives for banks to lend to MFIs).

[1]/ Box 2 is adopted from the IMF WAEMU Staff Report published on March 2022 (IMF Country Report No. 22/67).

B.   Challenges of Financial Inclusion in Niger

9.   **Niger faces multiple challenges to improve the inclusiveness of its financial system**, including low financial literacy, mismatch of financial services and products to the population needs, high cost of access and usage, informal sector dominance, and infrastructure gaps. Households enumerated the following main reasons preventing them to demand credit from formal financial institutions: *(i) do not meet the requirements, (ii) not able to repay, (ii) absence of banks, (iii) do not know how to apply for credit, (iv) do not have the capacity to repay* (Figure 4). These factors include both supply and demand side constraints requiring the involvement of a wide range of stakeholders—households, firms, banks, and the government—to lift them.

Figure 4. Niger: Reasons of Non-Access to Credit in 2018-19 (Percentage)

Source: EHCVM Niger 2018/19

10.   Low financial literacy hampers the use of services offered by the banking system.

Access and use of formal financial services require some financial knowledge and basic general literacy for which Niger lags well behind peer countries (Figure 5). Only 35 percent of adult Nigeriens are literate with an even lower rate for female literacy of 27 percent. Rapid population growth adds to the challenges to addressing the weaknesses of the education system.
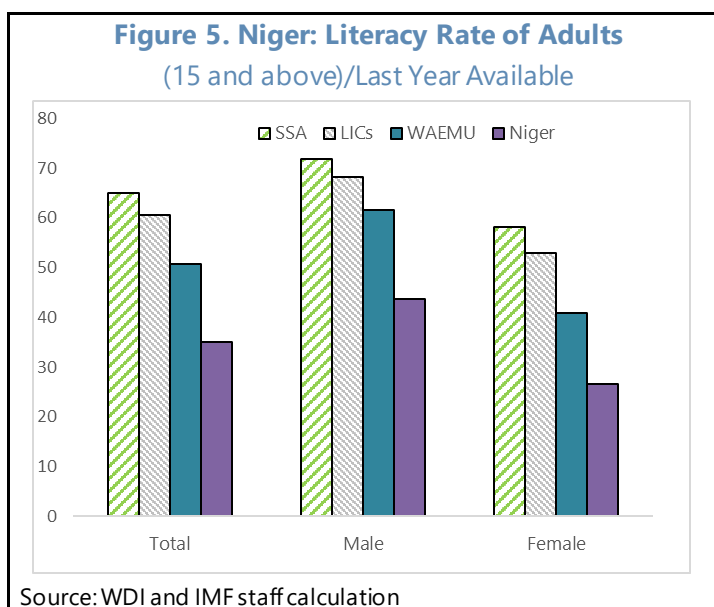
11.   Financial services and products are not well adapted to the needs of the population.

Figure 5. Niger: Literacy Rate of Adults
(15 and above)/Last Year Available

Source: WDI and IMF staff calculation

Financial services and products offered appears to not respond to the specificities of the large rural population (Figure 6) whose main activity remains agriculture, carried out mostly in an informal setting. This sector receives only 0.97 percent of bank credit, much less than allocations to the sector in other WAEMU countries amounting to 3 percent (Figure 7). Service providers are also reluctant to adapt to the cultural and social habits, as the potential that could be drawn the development of Islamic finance, seems under-exploited.
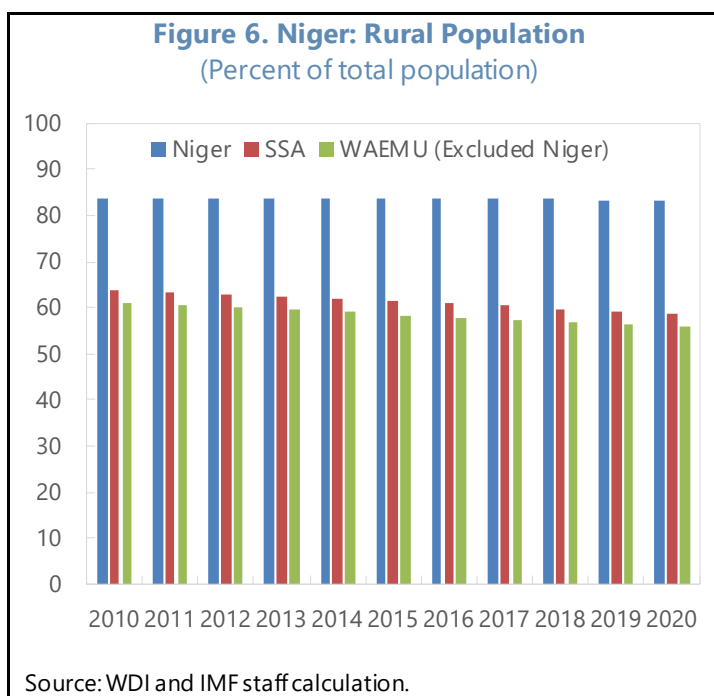
12.   Access to financial services is not affordable for a large segment of the population. The high poverty rate in Niger (estimated in 2021 at 41.4 percent of the population by the World Bank) as well as the relatively low per capita income constitute an obstacle to the broadening of financial inclusion.

Figure 6. Niger: Rural Population
(Percent of total population)

Source: WDI and IMF staff calculation.

Figure 7. Financial Exclusion Factor

Niger: Credit Allocation by Sector

WAEMU Countries: Correlation between GDP per Capita and Use of Formal Banking Services (2010-20)
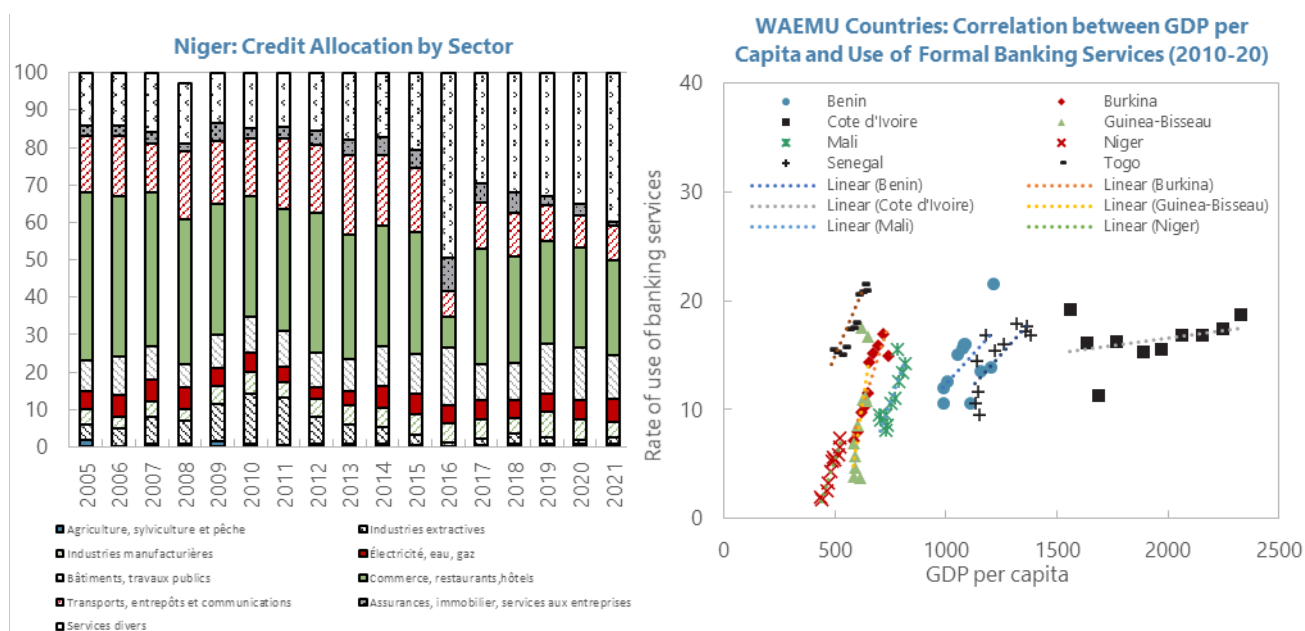
Source: BCEAO, WDI, and IMF staff calculation.

13.   Large levels of informality limit access to formal financial services, in particular, due to the lack of adequate documentation (such as financial statements.). The informal sector accounts for around 40 percent of Niger GDP. A large portion of Small and Medium Enterprises (SMEs) operate in the informal sector and do not have financial statements, up-to-date tax payment statements, or information on beneficial owners, which are required for credit applications. Moreover, non-recognized assets—with no legal documents—of firms operating in the informal sector cannot be used as collateral for bank credit. For example, during the outbreak in 2020, the Government of Niger took initiatives in collaboration with the banking sector to facilitate and maintain financing for the productive sector affected by the effects of the pandemic. A CFAF 150 billion financing mechanism was set up for this purpose, though only CFAF 17 billion of these funds (11 percent of the total fund) were used, because the dominance of informal nature of SMEs activities. Moreover, the absence of official documents such as land ownership titles or even birth certificates can limit access to credit on the household's side. Indeed, household survey data shows that approximately 65 percent of people under the age of 15 do not have a birth certificate.

Figure 8. Niger: Informality

Informal Sector in Percentage of GDP

Proportion of People with Birth Certificate (Under 15 Years Old)
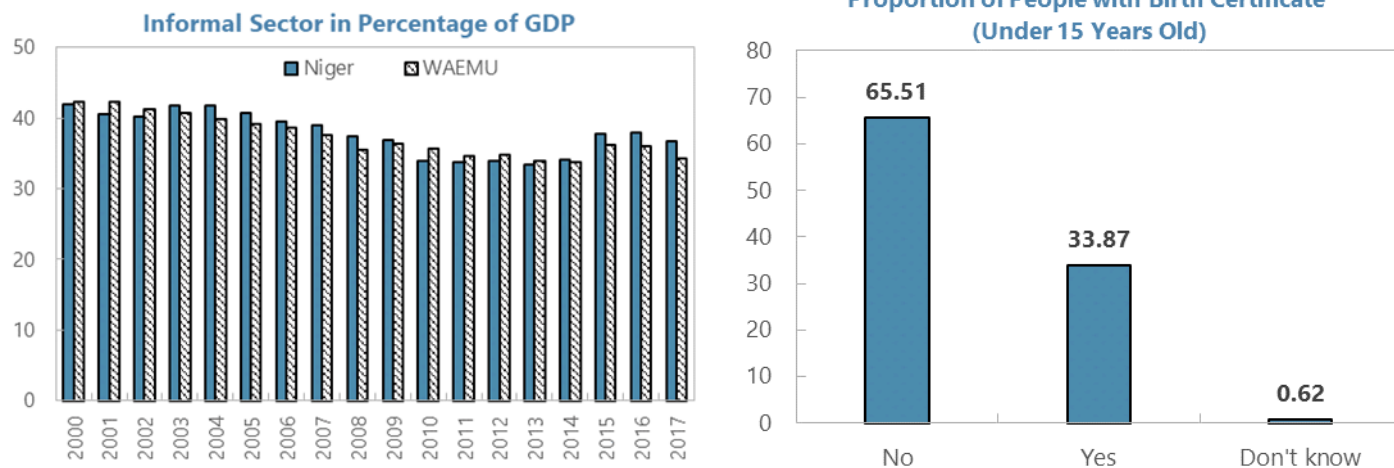
Source: Leandro Medina and Friedrich Schneider (2018), EHCVM 2018/19, and IMF staff calculation.

14.   Infrastructure gaps, in particular inadequate mobile phone networks and broadband connections, limit access to new financial products, such as mobile banking and electronic payments. Mobile banking reduces major barriers preventing excluded population to access and use formal financial services—by not requiring physical presence of banks, covering remote areas, offering lower entry barriers, and reducing costs of financial services. However, the lack of supporting infrastructure (electricity, mobile network, internet connection) and access to mobile devices in the country compared to its peers (Figure 9) pose a challenge to the uptake of digital financial services.

Figure 9. Niger: Mobile Banking Development and Supporting Infrastructure

Number of Active Mobile Money Accounts

Average of Mobile Cellular Subscriptions (per 100 People)

Average of Individuals Using the Internet (Percent of Population)

Average of Access to Electricity (Percent of Population)
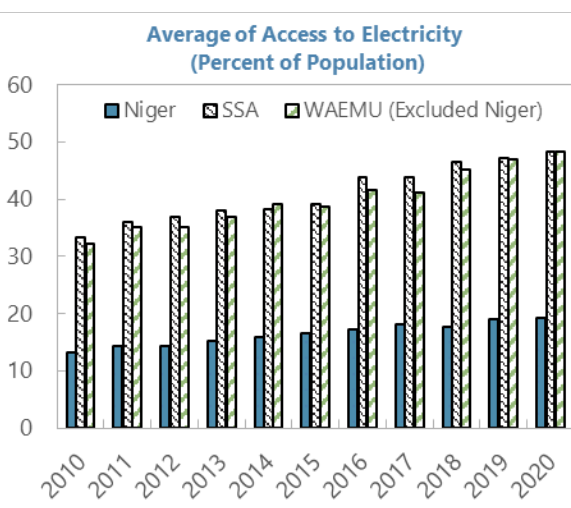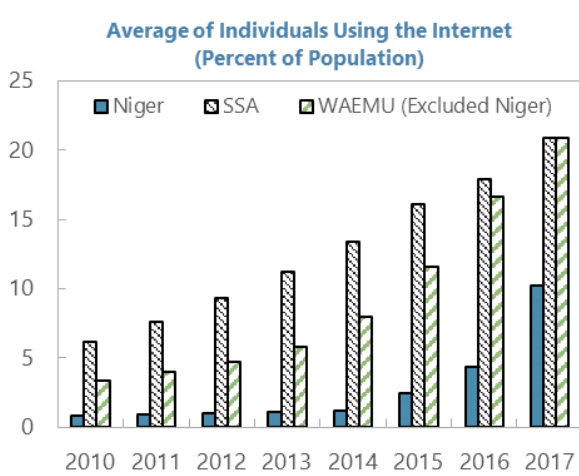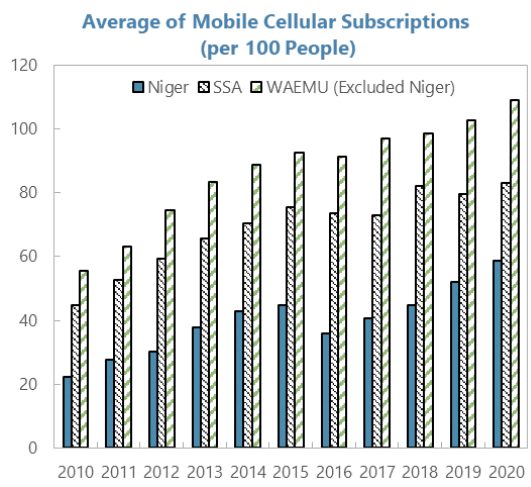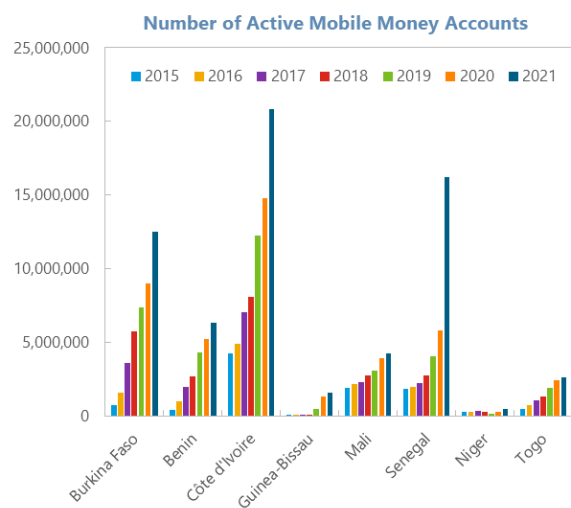
Source: WDI, FAS, and IMF staff calculation.

C. Policies to Foster Financial Inclusion in Niger

15.   Addressing the main challenges faced by the educational system is an imperative to improve financial literacy. Since the low level of financial literacy is closely linked to the general level of education of the population in Niger, which remains one of the lowest in the region and in the world, addressing the main issues undermining the education system should incidentally contribute to improving, in the medium and long term, the demand for and use of financial services. More specifically and in the short term, given the country's significant delay, it is important to expedite the finalization and implementation of the national financial education strategy currently being prepared by the authorities. This strategy should aim to identify and reduce the main structural obstacles and social or behavioral constraints that hinder financial education and access to financial services. The effectiveness of the collaboration between the actors of the financial ecosystem—notably through the mechanism for steering and monitoring the implementation of the strategy—and the quality of the communication and awareness-raising tools that will be deployed will be critical for the success of the strategy.

16.   Promoting the digitalization of financial services would also contribute to foster financial inclusion. One low-hanging fruit to ensure the expansion of digital financial services would be to accelerate ongoing efforts to implement the roadmap (adopted in 2020) for the complete digitalization of government payments. One of the main objectives of this plan is to facilitate and increase payments made and received by the State from individuals through existing digital mobile money platforms. The forthcoming implementation of the regional interoperability project led by the regional central bank (BCEAO) should create a further enabling environment by allowing payments between the government and individuals from any type of account and electronic payment platforms offered by banks, microfinance institutions and non-bank issuers of electronic money, in particular mobile money.

17.   Closing the gender gap in terms of access and use of financial services is imperative for women's economic empowerment in Niger. As women's savings rate tends to be higher than men's, improving their financial inclusion could also promote the development of the financial sector. However, the inadequacy or absence of collection of data on gender from financial service providers—and its analysis—constitutes a major impediment for the formulation of relevant, evidence-based policies in favor of the financial inclusion of women. The regional authorities, specifically the BCEAO, could take the initiative to organize and harmonize at the regional level the collection of such data—both on the supply side and on the demand side of financial services— needed to measure gender gaps, identify its main drivers, and formulate national strategies to close it. This initiative could take stock of the approach developed by the Women's Financial Inclusion Data Partnership (https://data2x.org/resource-center/womens-financial-inclusion-data-partnership-partnership-principles/) and benefit from technical assistance and funding from donors involved in this sector.

18.   Strengthening supervision is necessary to preserve the stability of the financial system and build costumer's trust. Strengthening the quality of supervision is essential to ensure that efforts to improve financial inclusion would not undermine financial stability through a deterioration

in the quality of the portfolio and prudential indicators of financial institutions. In this regard, the sharp increase since 2021 of banks and, to a further extent, MFIs non-performing loans requires taking urgent steps for closer supervision, specifically by strengthening the regional framework for assessing banks' credit risk (credit underwriting and portfolio monitoring). Emphasis should also be placed on enhancing the national supervision mechanism of MFIs by strengthening the operational capacities of the regulatory authority, in accordance with the recommendations of the sector's current restructuring and consolidation plan.

19.   Restructuring is necessary to re-establish a healthy and solid microfinance sector, which has the potential to be an avenue for promoting access to financial services for the most disadvantaged and vulnerable people, both in rural and urban areas. In this respect, the longstanding completion of the implementation of the restructuring and consolidation plan of the MFI sector remains a key priority. The last steps to be taken are related to the adoption and implementation of a recapitalization plan for Niger's two largest MFIs in, ASUS and TANADI—accounting for more than 50 percent of the sector's deposits and outstanding credit—, currently under receivership. Also, the ongoing revision at the regional level of the Law regulating MFIs activities should help put in place additional safeguards to ensure the viability of the sector, notably by strengthening the governance framework applicable to MFIs.

20.   Advance in the operationalizing the Financial Inclusion Fund (FDIF), including by mobilizing donor support. The FDIF created in 2020 as the central pillar of the National Financial Inclusion Strategy, is yet to be fully operationalized. While the text creating its governance bodies have been adopted and implemented, those related to its operational procedures are yet to adopted by the authorities. In addition, the financial resources necessary for the operation of the FDIF are not yet fully available. While during the round table of donors organized in 2021 sufficient pledges were made to cover the provisional budget for the implementation of the SNIF and FDIF, to date, no significant resources seem to have been effectively mobilized from donors, so that only two of the four windows of the FDIF are currently functional.

21.   A revision of the tax regime applicable to the banking sector is required to increase efficiency. A specific examination of the Tax on financial activities (TAFI) is necessary because of its economically inefficient nature—with a tax base consisting of the value of transactions and burdening the inputs engaged in the production of services without any possible deduction for taxes paid upstream. The relatively high rate of the TAFI, which is close to that of the VAT (but without the deductibility mechanism), amplifies its inefficiency and distortions and is therefore likely to harm the demand for financial services and the development of the financial sector. Hence, replacing the TAFI with the VAT should be a credible option to consider, notably to exempt inputs, at least partially, from indirect taxation—notwithstanding the practical difficulties related to the calculation the value added for financial intermediation services (remunerated by interest or margins) which explains why most countries with modern VAT systems exempt these services from VAT. However, other financial services remunerated by fees, commissions, or other charges may be subject to VAT with the usual mechanisms for deducting the VAT paid on purchases from the VAT collected on the services. A cost-benefit study of such a reform is however necessary to assess the

expected gains, particularly in terms of improving financial inclusion and development in Niger and the likely resulting loss of tax revenue.

22.   Improving the bankability of projects is important to increase access to finance by SMEs. For this purpose, it is necessary to reactivate the system set up in 2015 at the regional level. One of the key stakeholders of this mechanism, the support and supervision structures—responsible for supporting upstream SMEs in meeting the eligibility conditions and for carrying out ex post follow-up after the obtention of financing — is indeed not yet functional. Swift action to identify the root causes of this deficiency and implement appropriate measures to address them is therefore urgently needed. The National Support Fund for Small and Medium-Sized Enterprises and Small and Medium-Sized Industries (FONAP), created in 2020, is expected to partially fill the shortcomings of the regional support scheme, but it is not yet fully operational either. The implementing texts of the decree creating the fund have been adopted and implemented—with the establishment of its management bodies—but its funding remains to be secured and the manual of procedure to be finalized

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THE EFFECTS OF CLIMATE AND CONFLICT SHOCKS ON HOUSEHOLD WELFARE[1]

As livelihoods in Niger still depend to a large extent on agricultural production, shocks related to climate change and insecurity present a threat for the country's development path and are the main sources of vulnerability for the population in rural areas. This paper uses data from the latest household living standard survey to quantify the effects and interactions of these shocks on household welfare before proposing policy recommendations to enhance the resilience of households and the economy more generally. Our results show that when rainfall decreases by one standard deviation, per capita income falls by 11 percent. Furthermore, the impact of shocks on households depends on their adaptive capacity, which includes sufficient agricultural capital and income diversification. Without concrete adaptation measures, vulnerability to climate change is expected to increase in Niger, and human capital accumulation in poor household is also expected to deteriorate and could lead to a poverty trap.

A. Background

1.   The coexistence of multiple and regular shocks constitutes a threat to the development of   Niger. Niger is dealing with the consequences of a triple crisis, arising from the country's long-standing security and climate change-related challenges and, more recently, a health crisis associated with the coronavirus outbreak (COVID-19) in 2020. Shocks related to insecurity and climate change are regular and difficult to contain. Moreover, climate change and insecurity are linked. Climate change can increase the incidence of conflict between socio-economic groups by increasing resource scarcity as well as competition for resources.

2.   The confluence of these shocks renders the eradication of poverty extremely difficult. Development indicators in Niger point to high poverty and inequality, low human capital (figure 1), and an untapped demography dividend. Close to 41 percent of population lives below the poverty line and 83 percent of the population is located in rural areas. The poor are not evenly distributed across regions. Only 7 percent of the capital (Niamey) population is considered poor, while more than 45 percent of Dosso, Zinder, and Maradi population are poor. Inequality between regions and socioeconomic groups is also deepened with lack of basic infrastructure in remote areas. These vulnerabilities are deepened by the persistence of insecurity and the consequences of climate change.

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[1] Prepared By Yoro Diallo (AFR). Canghao Chen (AFR) and Joanna Delcambre (Staff Assistant AFRC1) assisted with the formatting of the charts assisted with the formatting of the charts.

Figure 1. Niger: Socioeconomic Indicators

Poverty Rate by Region in 2019

People Using at Least Basic Drinking Water Services (Percent of Population)

Mortality Rate under 5 (Per 1000 Live Births)

Access to Electricity (Percent of Total Population)
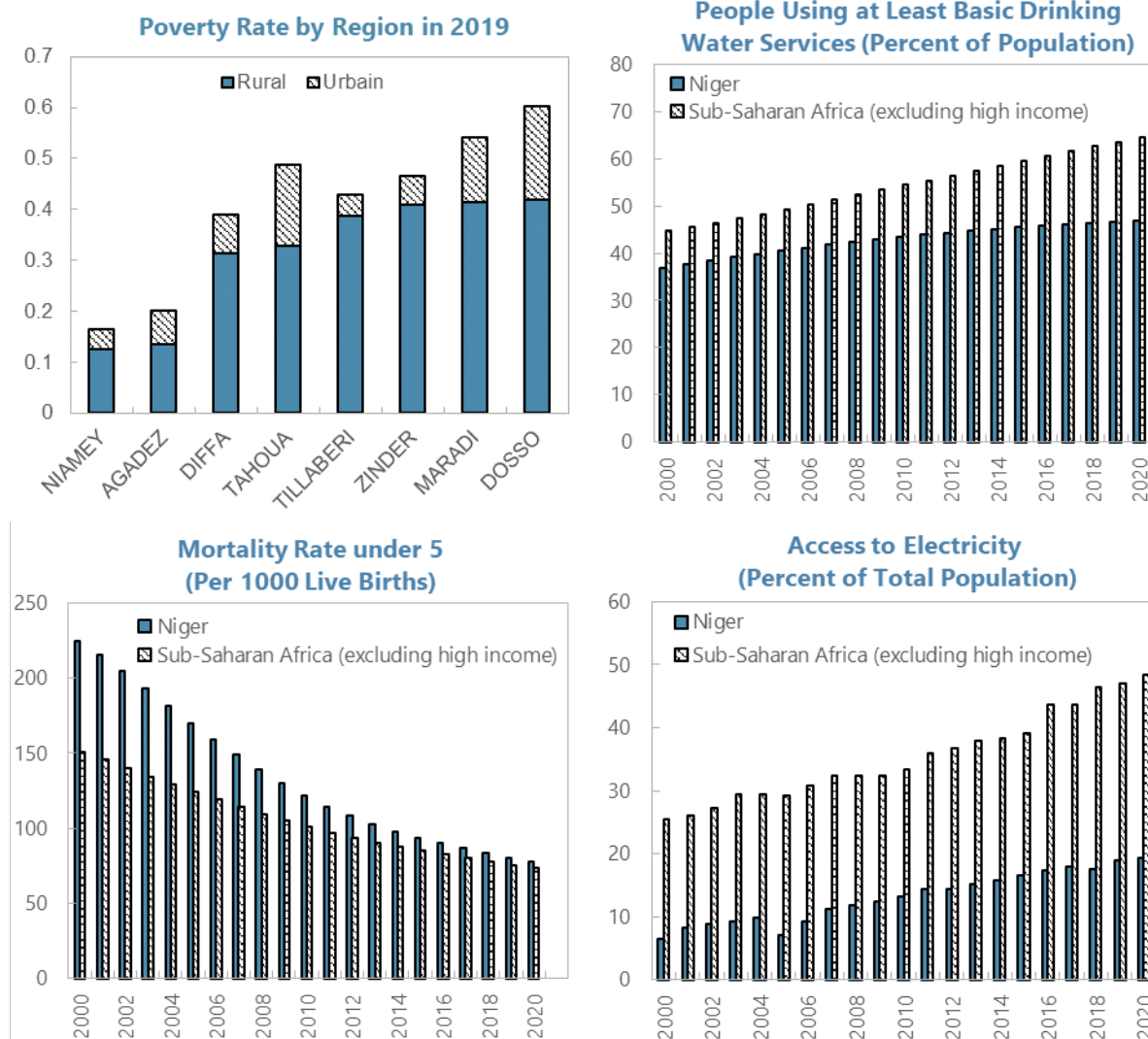
Source: WDI and IMF staff calculation

3.   Job opportunities are limited, and agriculture remains the main source of income for a large segment of the population. Niger's economy is not diversified and depends primarily on rainfed agriculture, which accounts for 36.4 percent of GDP in 2021. Around 73 percent of the total active population is engaged in the agricultural sector (figure 2) and the sector remains mainly based on subsistence production. The main cultivated crops (Rice, Millet, Maize, Sorghum) are vulnerable to climate change, which directly affects quantities produced in period of shocks (during droughts, for example), but also crop yields and labor productivity (World Bank CCDR, 2022). Moreover, conflicts

cause the abandonment of farms in risky areas, the destruction of agriculture infrastructure, thereby reducing domestic food supply and increasing vulnerability to climate change.

Figure 2. Niger: Importance of Agriculture Sector in the Economy

Source: WDI and EHCVM 2019
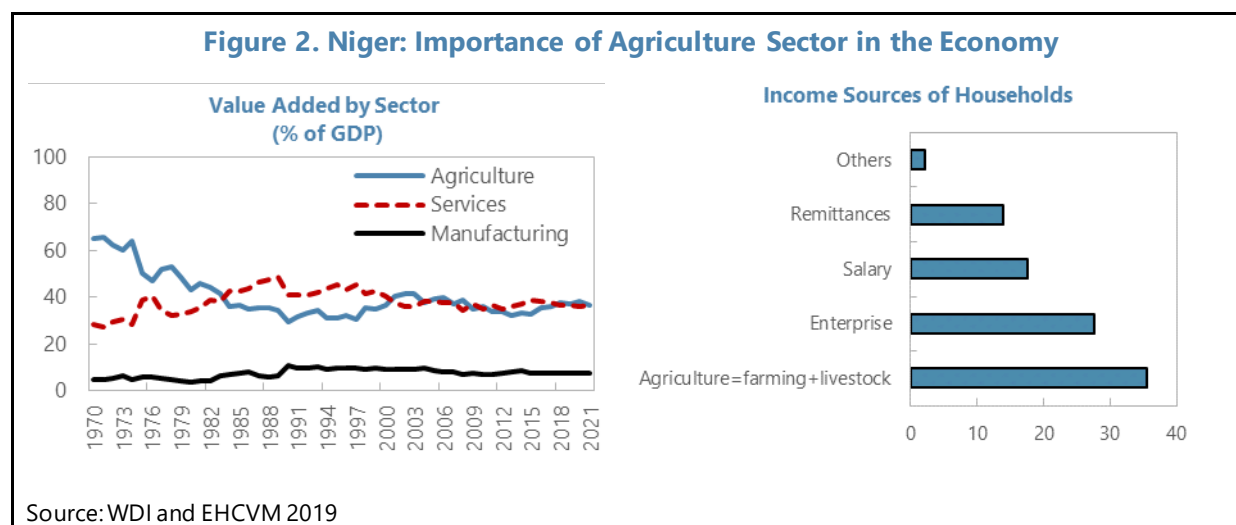
4.   Rapid population growth is putting pressure on labor markets and reducing the opportunity costs of participating terrorist activities. Annual population growth is estimated at 3.7 percent and in 2021 20 percent of the population was in the 15-24 age bracket. However, as these young people frequently lack access to labor market jobs because of a lack of marketable skills and limited job supply.

B.   Stylized Facts on Shocks Experienced by Niger

Vulnerability to Climate Shocks

5.   Niger is facing increasing aridity, marked by high volatility of weather conditions during the growing season (figure 3). The high volatility of rainfall makes it unpredictable and biases the decisions of economic agents, increasing their exposure to climate hazards, with the risk of losing crops, livestock, assets, and other productive resources.

6.   During the last century, the average annual temperature in Niger has increased significantly by 0.7 degree Celsius (figure 4). The increase in temperature over this period varies across regions, with Tillabery and Niamey recording the highest trend and Maradi and Zinder the lowest level in temperature increase. Over the same period, however, the change in annual rainfall does not appear to be evenly distributed across regions. Indeed, annual rainfall appears to be decreasing in each region, with the exception of Diffa and Agadez, where rainfall increased by 4.8 and 26.3 mm.

Figure 3. Niger: Cumulative Annual Rainfall by Season Over the Period 1901-2020[1]
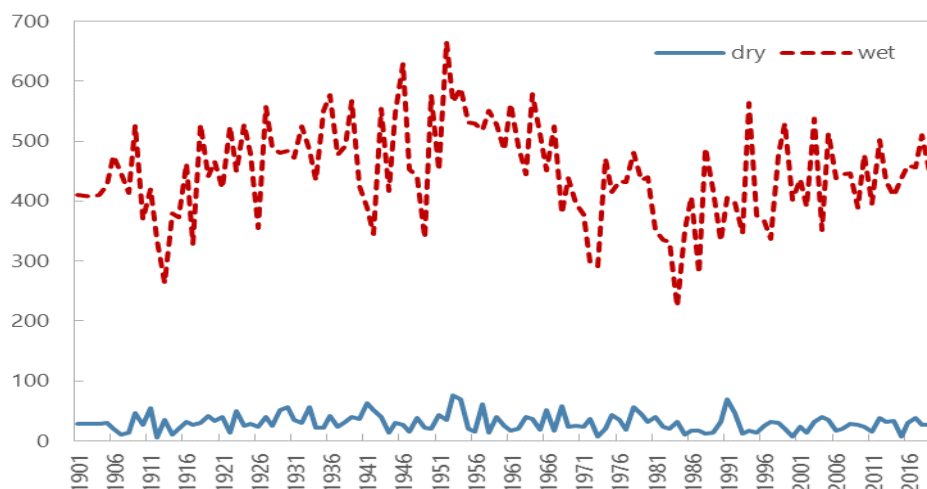
Source: CRU database and IMF staff calculation

1/ Wet season includes June, July, August, September, and October; and Dry season includes November, December, January, February, March, April, and May.

7. **Moreover, Niger has suffered different types of natural disasters over the past two decades.** Floods and droughts are the most frequent events. At least one of these types of disasters occurs in Niger every year. Extreme climate events can lead to large economic damages and human costs. According to the "Intended Nationally Determined Contribution (INDC)", the average losses due to droughts, in Niger, are estimated at over USD 70 million (0.6 percent of GDP). Drought episodes increase food insecurity, poverty, exposure to diseases like malaria, and the incidence of domestic conflicts (Diallo & Tapsoba, 2022). Furthermore, the poorest segments of the population are the most exposed to the consequences of climate change, due to their low capacity to adapt and their dependence on activities that are climate sensitive. Without any mitigation, natural hazards in Niger are projected to increase in frequency in the future (Sahel-CCDR 2022).

Table 1. Niger: Cumulative Variation of Climate Conditions Over 1901-2020

Regions	Precipitation (mm)	Temperature (degree celcius)
Agadez	4.84	0.53
Diffa	26.31	0.49
Dosso	-53.36	0.79
Maradi	-52.08	0.47
Niamey	-14.58	1.02
Tahoua	-34.35	0.62
Tillabery	-13.16	1.05
Zinder	-26.31	0.47
Niger	-27.77	0.67

Source: CRU database and IMF staff calculation

Figure 4. Niger: Annual Variation of Temperature and Precipitation Across Departments Over the Period 1901-2020[1]
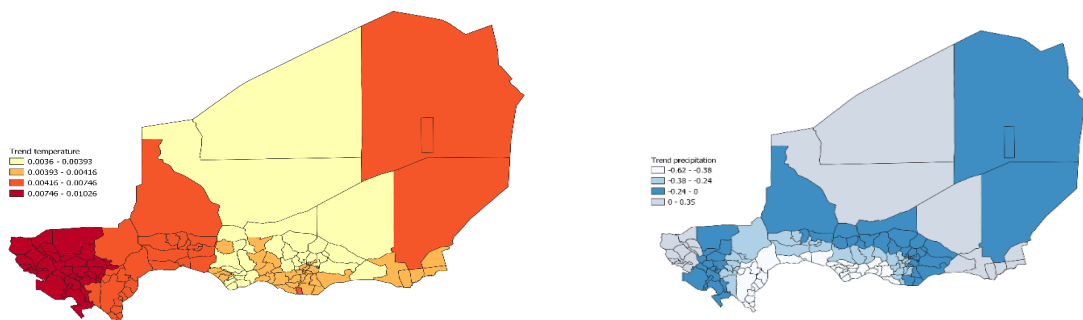
Source: CRU database and IMF staff calculation

For each region and both climate variables, the trend is obtained by estimating the following equation: $Y_t = \alpha + \beta.t + \varepsilon_t$, with Y_t climate variables (average annual temperature and annual cumulative precipitation), t year variable (1901, 1902, ..., 2020); ε_t residual term. Parameter β is the measurement of trend, which measures the annual variation of temperature (precipitation) over the period 1901-2020.

Figure 5. Niger: Natural Disasters Frequency and Consequences in the Sahel Countries, 2002-21
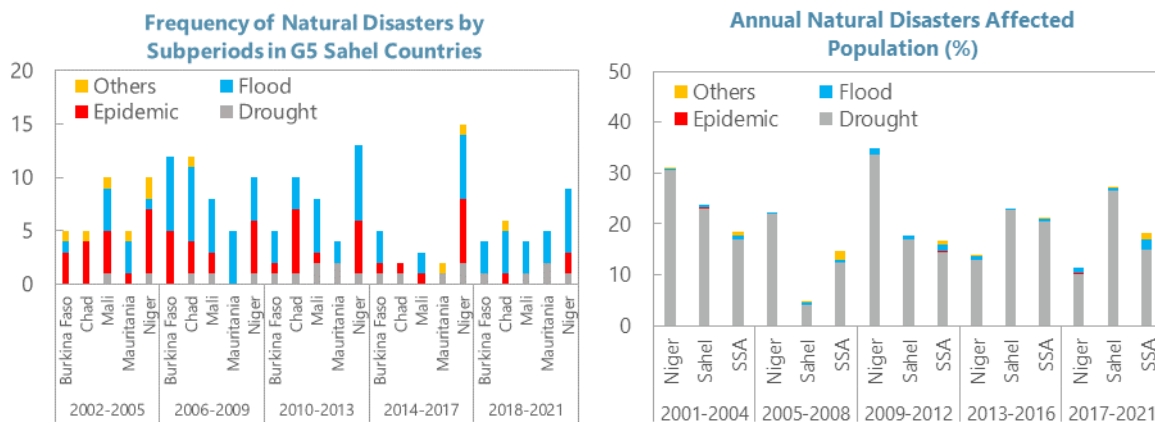
Source: EMDAT database and IMF staff calculation

Insecurity Profile

8.   **Similarly, to other Sahelian countries, Niger continues to face a large number of conflict events with a significant number of associated fatalities**. The number of conflict events and total fatalities are estimated at 2,209 and 6,140, respectively, in cumulative terms since 2010. Conflict could take many forms and violence against civilians appears to be the most frequent form (Figure 6, right panel).

9. **Conflict events are not evenly distributed across regions in Niger.** Incidents of violence are mainly concentrated in the southern and eastern regions, particularly in Diffa, Maradi, and Tillabery. These are the regions in which a large share of productive activities take place, including agricultural production and trade with the neighboring countries. These regions also suffer from the spillover effects of growing instability in neighboring Nigeria, Mali, Burkina Faso, and Chad.

Figure 6. Niger: Number and Fatalities of Conflicts by Type, 2010-22[1]

Source: ACLED database and IMF Staff calculation.

1/ The latest available data for 2022 is up to August 13.
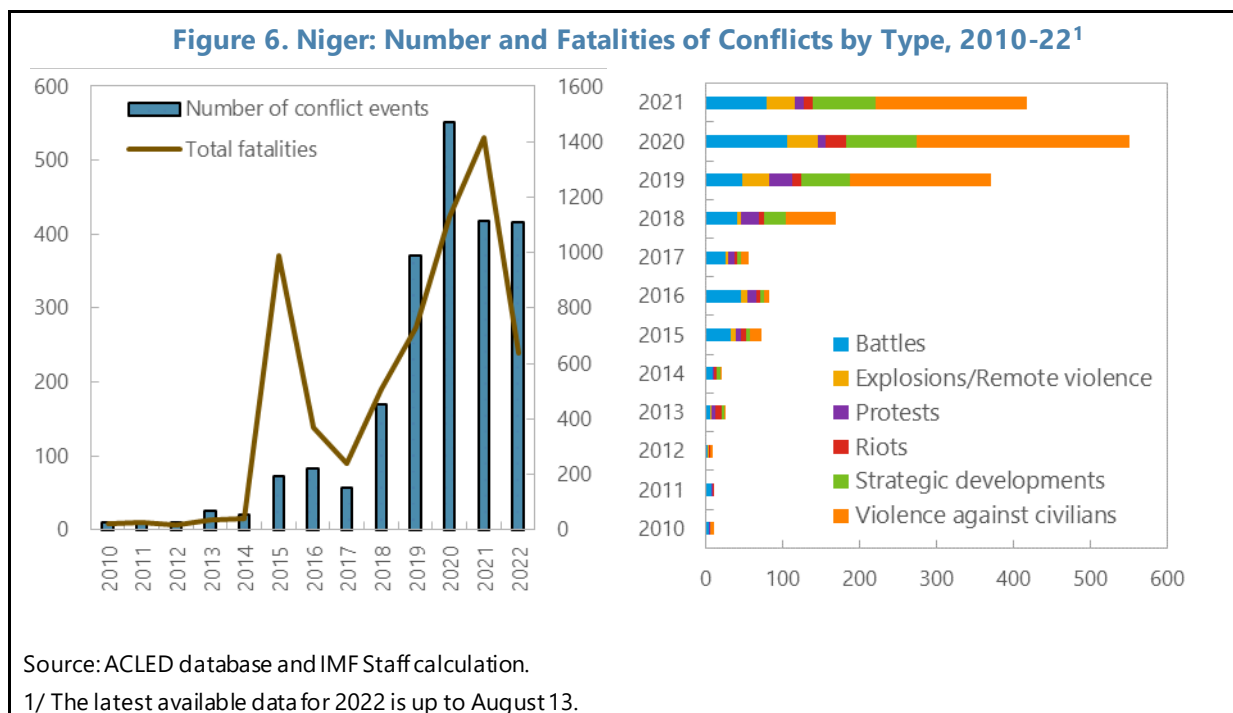
10. **Niger is characterized by a multiplicity of conflict risk factors.** Conflict in Niger is mainly explained by the following factors (UNDP, 2014):

Access to resources: natural resources availability, including land, water, and pastoral resources, has been decreasing in Niger (figure 8). This situation has been exacerbated by recurrent episodes of drought in the country and has led to competition between communities for access to these resources. In addition, the governance system suffers from a lack of an effective resource management, particularly in rural areas.

- *Rapid population growth*: low levels of education coupled with a limited capacity of the labor market to absorb the large number of young people, increases vulnerabilities to recruitment into armed rebel groups, particularly for young males.

- *Rise of religious intolerance.* The rise of Jihadist movements in the Sahara and Boko Haram on the border with Nigeria also constitutes a threat to stability in Niger.

Figure 7. Niger: Evolution of Geographic Position of Conflicts

2021

2020

2019

2018
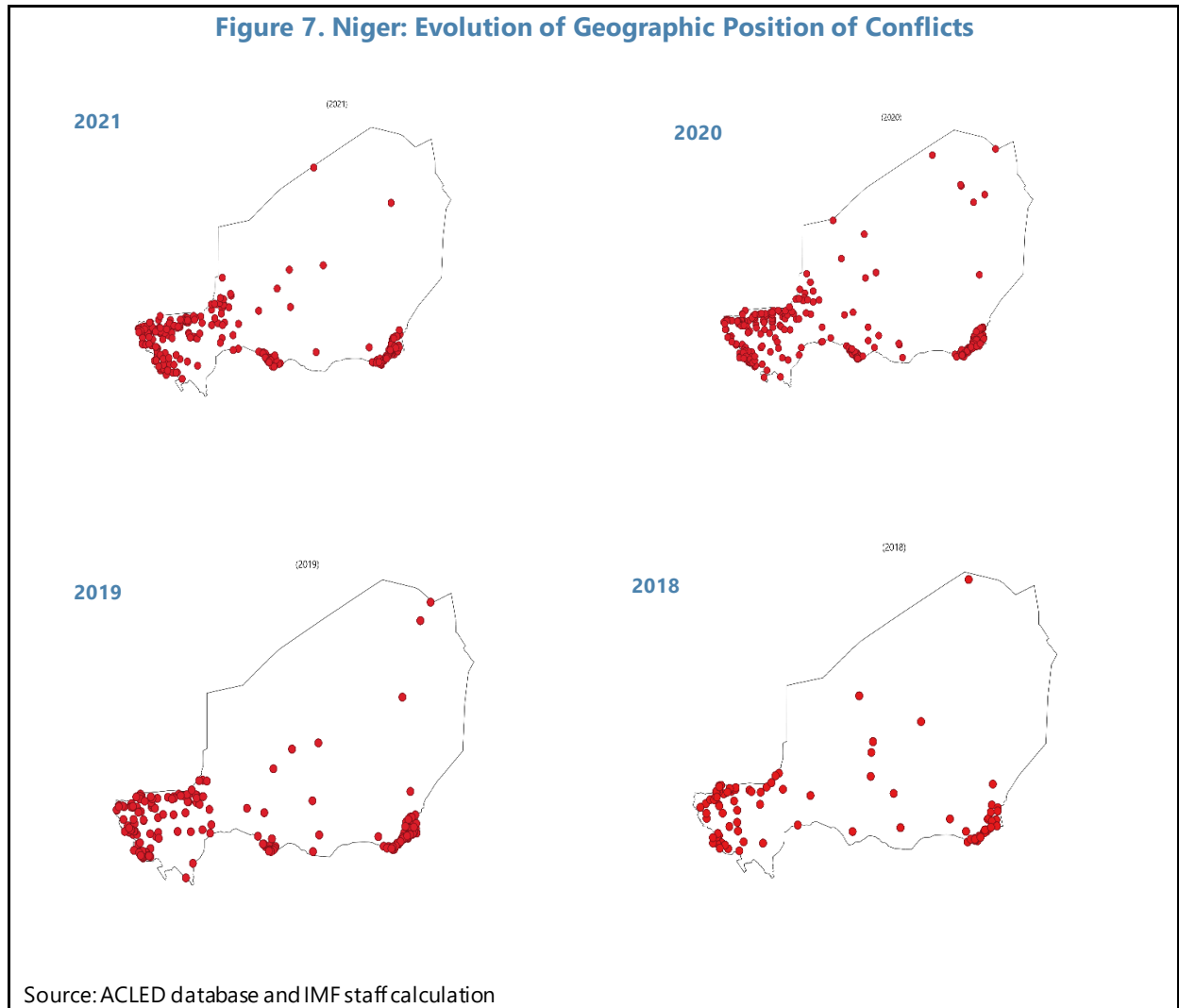
Source: ACLED database and IMF staff calculation

Figure 8. Niger: Availability of Natural Resources Over 1960-2020

Arable Land (Hectares Per Person)

Forest Area (% of Total Land Area)
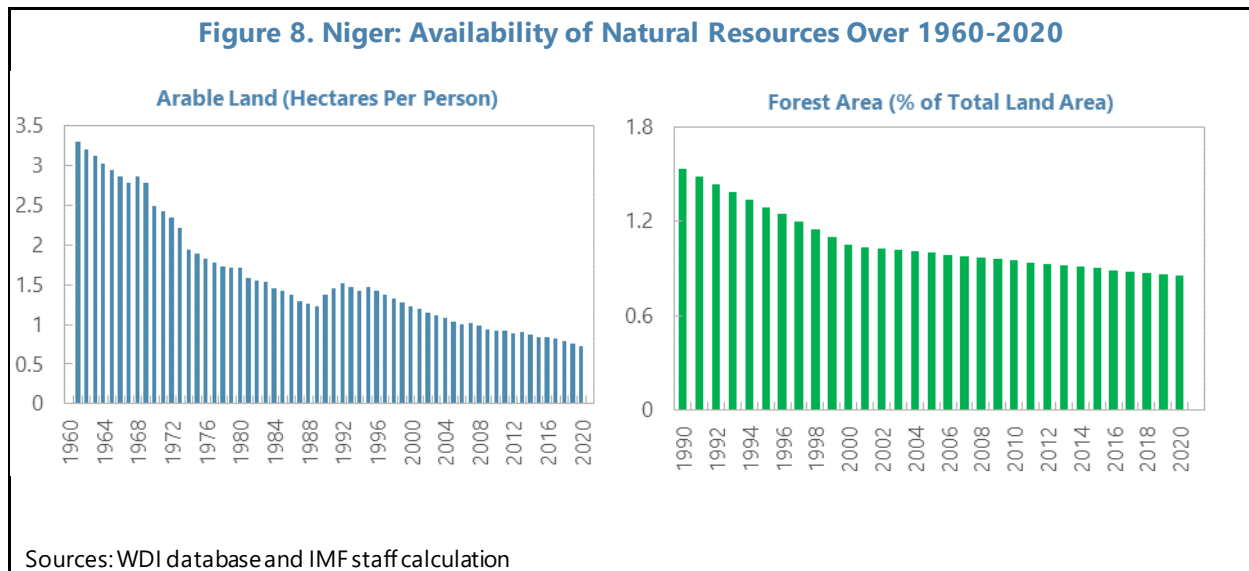
Sources: WDI database and IMF staff calculation

Economic Consequences of Climate and Conflict Shocks

11.   The effects of conflict and climate shocks are significant at both the micro and macro levels. At the macro level, episodes of weather shocks are associated with higher food inflation, food shortages, low GDP growth, increasing displacement of people from rural to urban areas, and increasing of current account deficits, added to the constraints it causes on government budget for a response plan setting. For example, cereal production was reduced by 38%, 11% in 2021 and 2005, respectively, following the droughts episodes that occurred during these years. Moreover, conflicts have similar macroeconomic effects on the volatility of GDP growth and lead to crowding out of priority spending. GDP growth is, on average, reduced by 2.5 percentage points in times of conflict in SSA countries (IMF, 2019).

Figure 9. Niger: Total Number of Internal Displacements

Source: Internal Displacement Monitoring Centre and IMF staff calculation

At the microeconomic level, these shocks could also increase school dropout rates, lead to the abandonment of farms in affected areas, affect households' welfare, including their income and consumption levels.

C. Estimating the Effects of Shocks on Well-Being

12.   Against this background, this paper analyzes the socio-economic effects of climate and conflict shocks in Niger. The paper focuses on the effects of shocks on household income, consumption, poverty, food insecurity and human capital. In addition, the paper assesses household adaptation capacities to these shocks.

Methodology

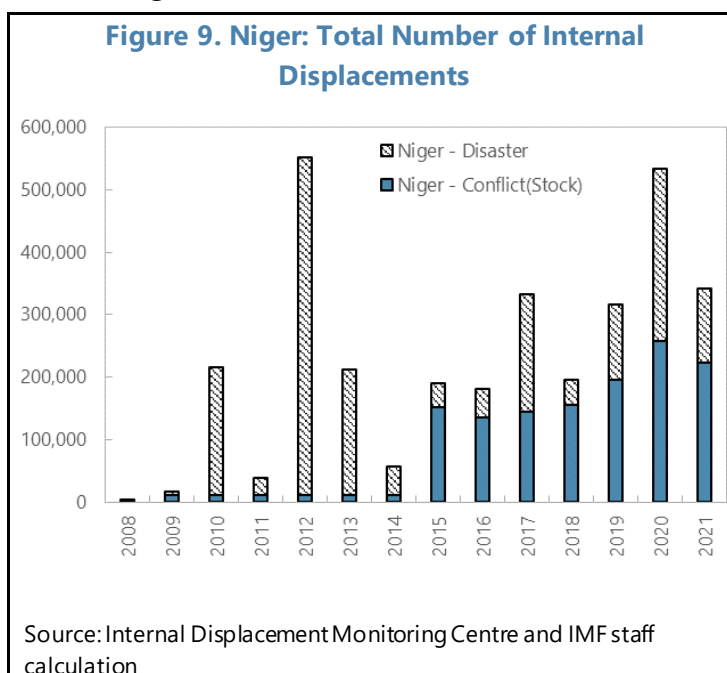**13.   A cross-sectional econometric model is used to quantify the relationship between climate, conflict, and well-being indicators.** The incidence of climate and conflict shocks is measured at communal level and merged with household survey data, including household socioeconomic indicators. Climate and conflict variables are respectively from Climate Research Unit (CRU) and Armed Conflict Location and Event Data (ACLED) databases. To understand the relationship between these shocks and household welfare, the following econometric model is estimated:

$$Y_{ij} = \alpha + \beta_1.Shock_j + \beta_2.X_{ij} + \beta_3.Rural_{ij} + \varepsilon_{ij} \qquad (1),$$

where *Y* represents the vector of selected welfare indicators that includes *income per capita, total consumption per capita, food consumption per capita, non-food consumption per capita, poverty status,*

food insecurity status, and school failure[2]. i and j represent subscripts for households and communes in the survey sample, respectively. $Shock_{ij}$ is the measurement of shocks (climate or conflict) observed in commune j. Regarding climate shock variables, we consider the level of annual precipitation and then its deviation from the average of the past five years[3]. The conflict shock is measured through the total fatalities induced by conflicts. X is a vector of control variables to capture households' characteristics such as: *age, gender,* and *the level of education* of *the household head*. We also control for household size and the residential location ($Rural_{ij}$[4]). $\mathcal{E}$ is the residual term. For the dependent variable's *poverty status, food insecurity status, and school failure,* we estimate equation (1) with a probit model. The dependent variable is therefore the probability that the household is poor, food insecure, or that a child is failing in school.

Results

14.   The income elasticity to rainfall is estimated at 0.33, which indicates that when rainfall decreases by one standard deviation, per capita income falls by 11 percent. Table 2 presents the baseline results. The coefficient associated with the rainfall level is significant at the one percent level. A one percent increase in the total cumulative annual precipitation level is associated with a 0.33 percent increase in per capita income (column 1). To follow the literature, we test the robustness of our result by also using the level of rainfall in the previous agricultural calendar year as the climate shock variable (column 2). The elasticity of per capita income to the precipitation level in the previous year is estimated at 0.39 percent and significant at one percent.

15.   The income elasticity to rainfall is larger for farm income and for the value of agricultural production. We found that a one percent increase in cumulative annual precipitation during the current or previous agricultural season is associated with an increase in agricultural income per capita of 1.9 and 2.4 percent, respectively. When we consider agricultural production rather than income as the dependent variable, we find similar results, but the elasticities appear to be larger (2.3 and 2.8 percent for the current and previous year of the agricultural season respectively, columns 5 and 6). In addition, the value of agriculture production is more sensitive to the level of precipitation during the wet season than during the dry season. Elasticities are estimated at 2.3 and 0.9 in the wet and dry seasons, respectively.

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[2] The analysis is based on the latest living standard household survey of Niger: "Enquête Harmonisée des Conditions de Vie des Ménages (EHCVM)". The EHCVM is a nationally representative survey including 6,024 households. Two waves were considered in the survey administration. The first wave was fielded between October 2018 and December 2018, while the second wave occurred between April 2019 and July 2019. Each wave has covered half of the total sample. The two-wave approach was chosen to account for seasonality of consumption. The survey database provides information on the characteristics of households and the community in which they live. The household questionnaire covers ten sections: (i) demographics; (ii) education; (iii) health, (iv) employment, (v) income sources and saving, (vi) consumption expenditures, (vii) food security (viii) agricultural activities, (ix) migration and remittances, and (x) poverty. The community questionnaire gathers information on (i) community characteristics, (ii) infrastructures, (iii) agricultural activities, (iv) community participation, and (v) prices of food items.

[3] Climate shock variable is computed with a Z score indicator as follows: $Zscore_{jt} = Abs\left(\frac{Rain_{jt} - \overline{Rain}_{last5years}}{SD_{Rain_{last5yers}}}\right)$

[4] $Rural_{ij} = 1$, if household i in commune j lives in a rural area.

16. **However, the elasticity of income with respect to the rainfall level depends on the income level.** Dividing our sample into two groups by the median income level, we found that the income elasticity to precipitation is significant for the bottom half, while it is not significant for the rest (columns 9 and 10). Indeed, the sample comprising households below the median income consists primarily of farmers and is mostly located in rural areas that are more vulnerable to weather conditions.

17. **Results for the control variables are consistent with the findings of the literature on the determinants of household welfare.** The results indicate that the education level of the household head is positively correlated with household total income per capita, and negatively associated with the likelihood to be in a food insecure and poverty situation. Moreover, the education level of the household head is positively correlated with total household income per capita, and negatively associated with the probability of being food insecure and poor. Furthermore, we find that households living in rural areas and female-headed households have lower welfare than those living in urban areas and male-headed households, respectively.

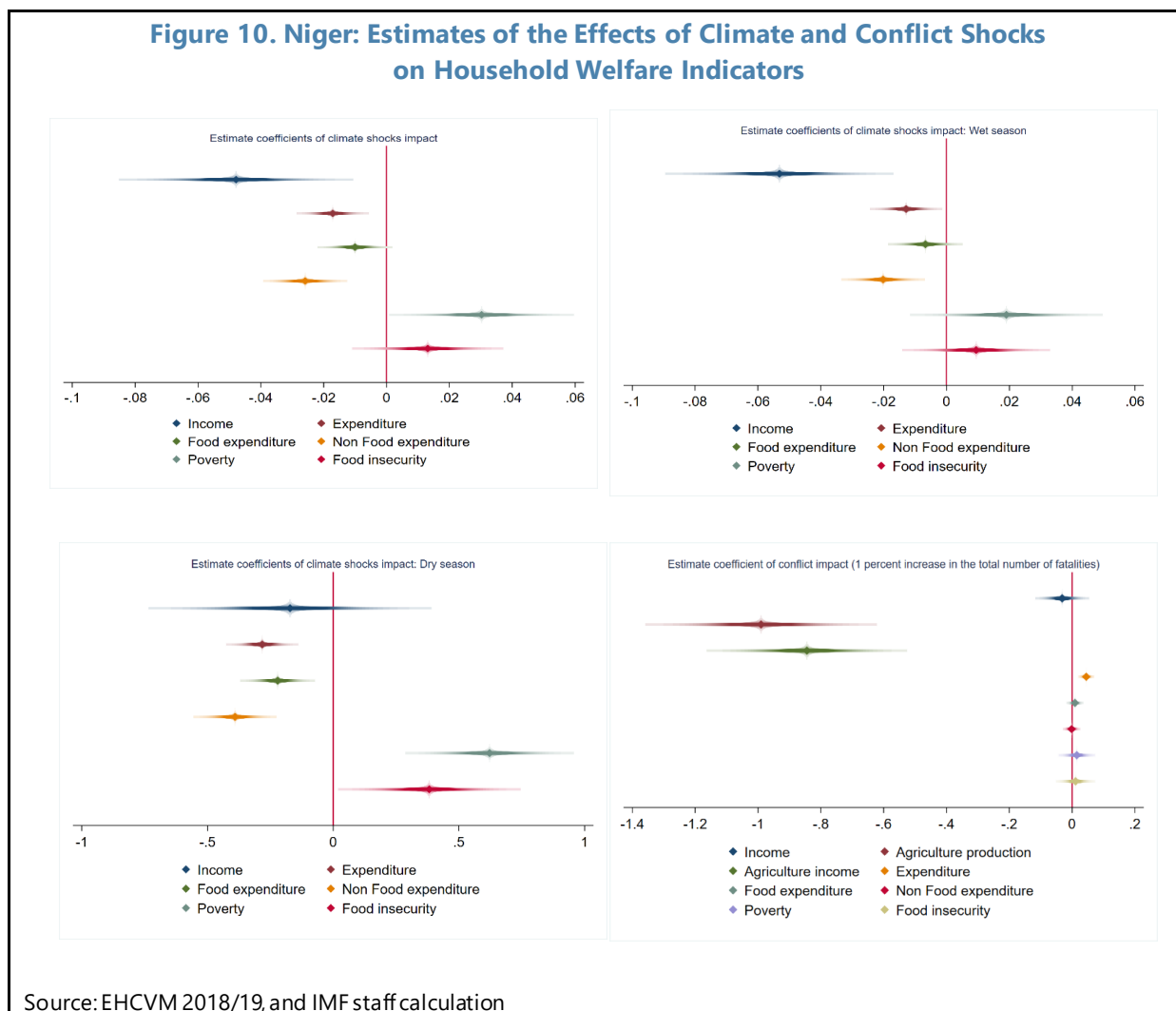### Table 2. Niger: Regression Baseline Results

VARIABLES	(1) Total Income per capita	(2) Total Income per capita	(3) Agriculture Income per capita	(4) Agriculture Income per capita	(5) Production value agriculture	(6) Production value agriculture	(7) Production value agriculture	(8) Production value agriculture	(9) Total Income per capita	(10) Total Income per capita
Precipitation 2017	0.330***		1.963***		2.276***				-0.023	
	(0.077)		(0.203)		(0.237)				(0.035)	
Precipitation 2018		0.388***		2.371***		2.751***				-0.067*
		(0.098)		(0.274)		(0.322)				(0.039)
Precipitation 2017 (wet)							2.330***			
							(0.250)			
Precipitation 2017 (dry)								0.924***		
								(0.123)		
Mediane (=1)#Precipitation 2017									0.898***	
									(0.145)	
Mediane (=1)#Precipitation 2018										1.191***
										(0.170)
Mediane (=1)									-8.042***	-9.974***
									(0.872)	(1.049)
Education HH	0.135***	0.139***	-0.295***	-0.277***	-0.326***	-0.305***	-0.317***	-0.329***	0.067***	0.068***
	(0.027)	(0.027)	(0.039)	(0.038)	(0.046)	(0.045)	(0.045)	(0.048)	(0.022)	(0.022)
Age HH	0.002	0.002	-0.008**	-0.007*	-0.005	-0.004	-0.004	-0.009*	0.001	0.001
	(0.002)	(0.002)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.002)	(0.002)
Gender HH	-0.308***	-0.306***	-1.965***	-1.949***	-2.129***	-2.111***	-2.120***	-2.197***	-0.097	-0.093
	(0.099)	(0.099)	(0.192)	(0.192)	(0.215)	(0.215)	(0.215)	(0.213)	(0.088)	(0.088)
Size	-0.068***	-0.068***	0.182***	0.178***	0.306***	0.302***	0.305***	0.327***	0.016*	0.015*
	(0.010)	(0.010)	(0.019)	(0.019)	(0.022)	(0.022)	(0.022)	(0.022)	(0.009)	(0.009)
Rural	-0.693***	-0.705***	5.454***	5.375***	6.377***	6.284***	6.314***	6.960***	0.071	0.060
	(0.102)	(0.103)	(0.274)	(0.273)	(0.323)	(0.323)	(0.322)	(0.316)	(0.078)	(0.077)
2.vague	0.291***	0.292***	0.588***	0.596***	0.555**	0.565**	0.553**	0.565**	0.170***	0.172***
	(0.077)	(0.078)	(0.210)	(0.212)	(0.240)	(0.237)	(0.237)	(0.253)	(0.054)	(0.054)
Constant	9.974***	9.566***	-8.276***	-11.057***	-10.353***	-13.590***	-10.507***	0.221	12.348***	12.611***
	(0.511)	(0.637)	(1.263)	(1.713)	(1.468)	(2.006)	(1.523)	(0.650)	(0.250)	(0.277)
Observations	5,895	5,895	5,895	5,895	5,895	5,895	5,895	5,895	5,895	5,895
R-squared	0.060	0.059	0.396	0.392	0.428	0.424	0.428	0.397	0.354	0.357

Robust standard errors in parentheses. The errors have been clusterized by grappe, icluding regions. All dependant variables and climate are in logarithm. Thus the coefficients correspond to an elasticity. *** p<0.01, ** p<0.05, * p<0.1

Source: IMF staff calculation

18. **In addition, climate shocks have a negative effect on household living standards, including consumption levels, poverty, and nutritional status (figure 10).** Climate shocks measured as a deviation from the average rainfall of the previous five years, reduce per capita income,

and total household consumption levels. The coefficients associated to these two variables are significant at the one percent level and estimated at -0.05 and -0.02. This suggests that for every unit increase in the climate shock indicator, households' income and consumption decrease by 5 and 2 percent respectively. Looking at the composition of consumption, we found that food consumption is reduced by 1 percent, while non-food consumption is reduced by 3 percent. In other words, a one standard deviation decrease in annual precipitation will reduce total consumption, food consumption and non-food consumption, by about 5, 2.2, and 6.6 percent respectively. It seems that when facing a shock, households prefer to smooth their consumption level by reducing consumption of non-vital goods. Moreover, the results show that climate shocks increase the probability of being poor and food insecure.

Figure 10. Niger: Estimates of the Effects of Climate and Conflict Shocks on Household Welfare Indicators

Source: EHCVM 2018/19, and IMF staff calculation

19.   When the number of conflict related deaths increases by 10 percent[5], farm income and the value of production decrease by 10 and 8 percent respectively. Indeed, we found that a one

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[5] A 10 percent increase in the total number of fatalities corresponds on average to about one additional death in our sample.

percent increase in conflict-related deaths is associated with a decrease in farm income and the value of production by 1 and 0.8 percent, respectively. These coefficients are both statistically significant at the one percent level. Nevertheless, the coefficients for the other dependent variables—namely *total consumption, poverty status, and food insecurity status*— are not statistically significant, although they have the expected sign.

20.   Weather shocks can also lead to a reduction in human capital. Table 2 shows the effects of climate and conflict variables on the probability that a child in the household will not succeed in school. A one standard deviation decrease in annual rainfall reduces the probability of school failure by around 2 percentage points. The marginal effect is larger when the climate shock is observed during the agricultural growing season rather than the other months of the calendar year. Conflict does not seem to have a significant effect on school failure even the associated coefficient sign is positive.

Table 3. Niger: Impact of Climate and Conflict Shocks on School Failure Likelihood						
	School failure likelihood (percentage points)					
	dy/dx	**std. err.**	**z**	**P>z**	**[95% conf.interval]**	
1 sd derease of annual precipitation	**1.7*****	0.004	2.090	0.036	0.000	0.015
1 sd increase of precipitation (Wet season)	**2.7*****	0.010	3.210	0.001	0.012	0.052
1 sd increase of precipitation (Dry season)	**-0.1**	0.005	-1.060	0.289	-0.015	0.005
1 percent increase in total conflict fatalities	**0.004**	0.004	0.820	0.411	-0.005	0.012
Source: EHCVM database and IMF staff calculation						

21.   Moreover, the impact of shocks on households depends on their adaptation capacity. We estimated the effect of shocks as a function of the level of agricultural capital and household income diversification:

- **The level of agriculture capital is essential to mitigate the adverse effects of shocks (figure 11).** We constructed an Agricultural Assets Welfare Index (AAWI) using a Principal Component Analysis (PCA). This exercise allows us to identify households that are deprived of the materials (e.g., p*lows, axes, ploughing animals, irrigation schemes, etc.*) needed for production. The AAWI distribution shows that the level of capital of a large proportion of farmers in Niger is very low. The econometric estimation results show that the AAWI increases the level of agricultural productivity and mitigates the impact of climatic shocks and conflict incidents on agriculture production.

- **Households' income diversification could reduce their vulnerability to shocks (table 4).** To measure the concentration of household income, we calculated a Herfindahl-Hirschman Index

(HH-income) on the various possible sources of household income, including wages, transfers, agriculture, entrepreneurship, etc. The average of the index is estimated at 0.70, which means a higher concentration of income on a single activity (about 30 percent of households have only one source of income). We interact this variable with the shock variables (climate and conflict), and the estimation results show that households with more than one source of income are better able to cope with the shock compared to those with only one source of income. However, the results are more significant for climate shocks than for the conflict variable.

Figure 11. Niger: Distribution of AAWI Shows Poor Agriculture Capital Significancy

Kernel density estimate of Agriculture Wealth Index

kernel = epanechnikov, bandwidth = 0.3
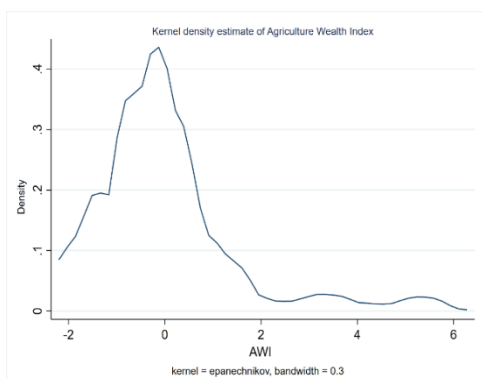
VARIABLES	(1) log(agriculture Income per capita)	(2) log(agriculture production value per capita)	(3) log(agriculture Income per capita)	(4) log(agriculture production value per capita)
log(rainfall)	3.082***	3.645***		
	(0.362)	(0.429)		
log(fatalities)			-1.198***	-1.436***
			(0.125)	(0.145)
Mediane (AAWI)=2	8.939***	13.432***	2.288***	2.586***
	(2.851)	(3.894)	(0.180)	(0.196)
Mediane (AAWI)=2#log(1+rainfall)	-1.037**	-1.696***		
	(0.455)	(0.619)		
Mediane (AAWI)=2#log(1+fatalities)			1.062***	1.336***
			(0.144)	(0.160)
Control variables	yes	yes	yes	yes
Observations	4,590	4,590	4,590	4,590
R-squared	0.338	0.376	0.315	0.356

Robust standard errors in parentheses. The errors have been clusterized by grappe, icluding regions. Control variables include education, age,and gender of household head, and household size and residence place (urban/Rural). *** p<0.01, ** p<0.05, * p<0.1

Source: EHCVMA, and IMF staff calculation

Table 4. Niger: Income Diversification Mitigates the Adverse Effects of Shocks

VARIABLES	(1) Total income pc	(2) Total consumption pc	(3) Total food consumption pc	(4) Total non- food consumption pc	(5) Total income pc	(6) Total consumption pc	(7) Total food consumption pc	(8) Total non- food consumption pc
Climate shock	-0.120	-0.207***	-0.137**	-0.333***				
	(0.257)	(0.054)	(0.060)	(0.058)				
HH-income	0.343**	0.079***	0.053*	0.095***	-0.120	0.043**	0.021	0.059***
	(0.136)	(0.030)	(0.032)	(0.036)	(0.079)	(0.018)	(0.021)	(0.021)
Climate shock#HH-income	-0.886***	-0.163**	-0.130*	-0.191**				
	(0.300)	(0.067)	(0.077)	(0.083)				
Conflict					-0.101**	0.049***	0.048***	0.049***
					(0.049)	(0.011)	(0.011)	(0.013)
Conflict#HH-income					0.186***	-0.015	-0.007	-0.023*
					(0.053)	(0.011)	(0.013)	(0.013)
Constant	11.382***	13.743***	13.192***	12.855***	11.938***	13.440***	12.902***	12.521***
	(0.316)	(0.067)	(0.066)	(0.081)	(0.242)	(0.050)	(0.050)	(0.062)
Observations	5,823	5,823	5,823	5,823	5,895	5,895	5,895	5,895
R-squared	0.061	0.528	0.383	0.558	0.055	0.517	0.375	0.545

Robust standard errors in parentheses. The errors have been clusterized by grappe, icluding regions. *Climate shock* is measured as the deviation of rainfall to its past five years average level; *Conflict* is the logarithm of total fatalities and *HH-income* is the income concentration index. Control variables include education, age,and gender of household head, and household size and residence place (urban/Rural). *** p<0.01, ** p<0.05, * p<0.1.

Source: EHCVM and IMF staff calculation

D. Policies to Build Resilience and Sustain Livelihoods

22.   There is a need to invest in the expansion of irrigation to withstand the challenges of climate change. The lack of large-scale irrigation infrastructure prevents farmers to adequately cope with increasingly frequent drought episodes. Less than one percent of agricultural land in Niger is irrigated. While the country only benefits from a short rainy season of three months, tapping into its huge underground water potential would strengthen the resilience of the agricultural sector. In addition, the Government could increase water sources for agriculture by investing in the creation of runoff water reservoirs and their use for irrigated crops.

23.   Improving access to renewable energy equipment could contribute to close the country's energy gap and modernize the agricultural sector. Limited access to electricity is a major obstacle to the use of irrigation pumps in rural areas—more than 80 percent of the population has no access to electricity, and only one percent of the rural population has regular access to electricity. While the cost of extending the electrical grid to remote areas might be high, Niger's renewable energy potential (solar, hydropower, and wind) could be tapped to close this gap in partnership with the private sector. Although the government has adopted a national electricity access strategy, its implementation remains critical.
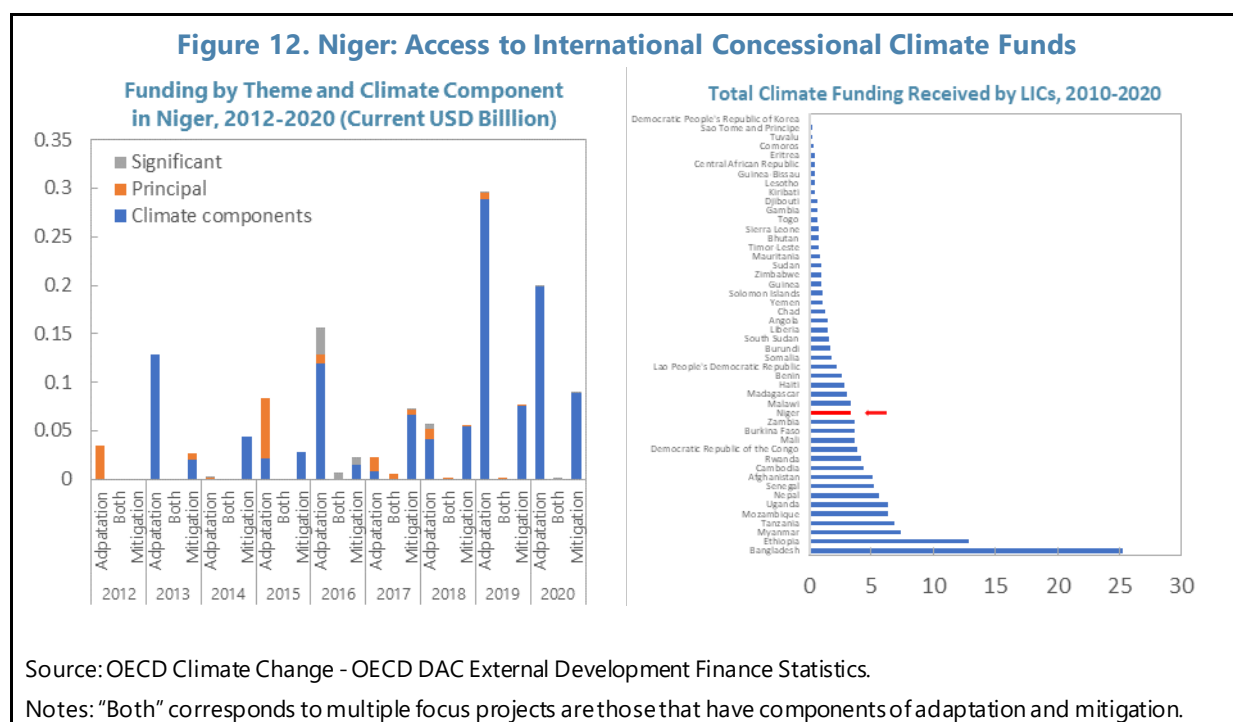
24.   Facilitating access and use of appropriate weather information could increase preparedness. The development of a weather forecasting system that could provide weekly, monthly, and seasonal forecasts to farmers can be extremely useful before, during and after a climate shock. Such information system could help households better prepare their adaptation responses and better mitigate the damage caused by the shock. With low literacy rates among rural populations, the government could support the transition from traditional indigenous weather forecasting systems to the use of modern climate information in rural areas by scaling up agriculture extension services. This could also directly support community-based disaster risk reduction programs (Iticha & Husen, 2019).

25.   The development of a robust social protection framework can support and sustain the mitigation efforts against climate shocks and conflict. Programs targeting climate-related vulnerabilities for example, by subsidizing the premium for climate insurance services-could be integrated into the existing social protection system. Moreover, an effective social safety net should improve access to basic infrastructure, including education and health, thereby reducing the vulnerability of people, especially youth, and preventing them from joining an armed group. Increasing the effectiveness of social protection in Niger will also require taking steps to promote digitalization and the creation of a single social registry [*see SIP on Social protection efficiency*].

26.   Fostering private sector development is crucial to diversifying household income sources. Our results have shown that the main transmission channel of climate shocks on household income is high exposure to the agricultural sector. The development of the private sector could therefore contribute to diversifying income sources of households, and thus strengthen their capacity to smooth the effects of shocks on their consumption and reduce the risk of being food insecure. Furthermore, deepening financial inclusion is crucial for households to initiate new activities in

addition to agricultural production. In this context, the full operationalization of the existing financial inclusion funds (FDIF and FONAP), digitization of enterprise creation procedures, and the simplification of the tax code initiated by the authorities should create a favorable environment for private sector development.

27.   Access to international climate funds is crucial given limited fiscal space. The implementation of Niger's climate adaptation and mitigation strategy is estimated, for the period 2021-2030, to cost USD 9.9 billion. Access to climate finance instruments could be part of the solution to address these costs. Such financing is diversified and includes concessional funds, green and sustainable/social bonds, debt-for-climate swaps, and climate insurance schemes, provided by multilateral and bilateral donors. Over the 2010-2022 period, Niger has received a total of USD 3.3 billion in climate funds (figure 12). Niger's access to these funds requires strengthening the country's governance and risk management framework in order to meet the access criteria. For example, the authorities could develop a climate investment plan that could be an advocacy tool for donors.

Figure 12. Niger: Access to International Concessional Climate Funds

Source: OECD Climate Change - OECD DAC External Development Finance Statistics.

Notes: "Both" corresponds to multiple focus projects are those that have components of adaptation and mitigation.

28.   Strengthening the social contract between the government and the population is an important factor to enhance internal stability. Investing in and providing access to essential infrastructure (roads, electricity, health etc.) in both urban and rural areas is essential to maintaining the social fabric. The adequate selection and prioritization of public investments in these areas are important for improving the living conditions of the population. Furthermore, the government must continue to fight corruption and strengthen governance. This would protect property rights and facilitate the management of natural resources, which is a major cause of conflict between communities. For example, the creation of transboundary institutions for land and water management could be extended for reducing conflict risks in resource-scare regions (Busby, 2018).

The role of such institutions would be to manage the allocation of natural resources —including during shock times—and facilitate dispute resolution between communities.

Box 1. Niger: Government Adaptation Strategies Against Climate Change

Although the contribution of Niger to greenhouse gas (GHG) emissions is low, the country is experiencing the consequences of climate change. The Government is engaged in implementing actions to address this**.** In 2016, Niger submitted its National Determined Contribution (NDC) after ratifying the Paris Agreement. The objectives of the NDC are to implement, at the same time, measures of adaptation to climate change and GHG mitigation. The main pillars of Niger's NDC aim to encourage the adoption of climate-smart agriculture techniques (*weather information, early warning system, index-based agriculture insurance, management of risks and disaster, etc.*) and expand the use of and access to modern and clean energy services for all by 2030. In 2021, the authorities have revised their NDC to define its governance, including the creation of institutions to oversee the implementation of the strategy. While the government is making efforts to mobilize domestic resources, there are still financing gaps to achieve the NDC goals. The total cost of the NDC over the next decade (2021-2030) is estimated at US$9.9 billion, with the government contributing 26.4 percent and donors expected to fund the rest.

Figure 13. Niger: National Determined Contribution Cost, 2021-30 (USD Billion)
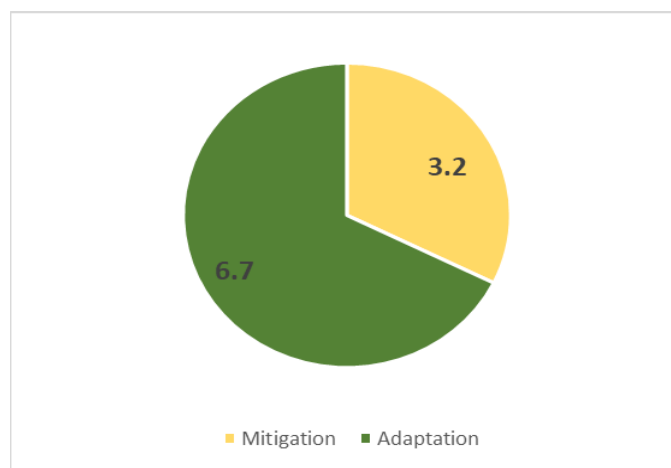
Source: Niger NDC, 2021

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Annex 1. Descriptive Statistics of Variables

Table 1. Niger: Descriptive Statistics of Variables					
Variable	Observations	Mean	Std. dev.	Min	Max
Dependent variables					
Total income per capita	5,895	236293.10	644891.90	0.00	19700000.00
Total agriculture income per capita	5,895	24405.29	68310.66	0.00	2157387.00
Total agriculture production per capita	5,895	28157.82	79820.46	0.00	2316477.00
Total expenditure per capita	5,895	489712.40	553085.10	49807.36	12400000.00
Total food expenditure per capita	5,895	265623.50	213293.60	11761.77	2924820.00
Total non-food expenditure per capita	5,895	224088.90	387547.20	16633.63	10400000.00
poor	5,895	0.32	0.47	0.00	1.00
Food insecurity	5,871	0.24	0.43	0.00	1.00
School failure	6,051	0.11	0.31	0.00	1.00
Shock variables					
Total rainfall 2018	5,895	501.82	167.19	53.29	816.31
Total rainfall 2018 (wet)	5,895	476.37	154.44	47.23	741.69
Total rainfall 2018 (dry)	5,895	25.46	19.69	0.21	97.51
Z-score precipitation shock 2018	5,895	2.21	2.50	0.02	10.25
Z-score precipitation shock 2018 (wet)	5,895	2.28	2.57	0.03	11.03
Z-score precipitation shock 2018 (dry)	5,823	0.34	0.21	0.03	1.04
Conflict fatalities 2018	5,895	7.67	32.89	0.00	250.00
Interaction variables					
AAWI	4,640	0.00	1.45	-1.90	5.98
Income concentration index	5,895	0.71	0.26	0.00	1.00
Household characteristics					
Age (Household head)	5,895	44.53	14.69	15.00	100.00
Gender (Household head)	5,895	1.16	0.37	1.00	2.00
Education (Household head)	5,895	1.79	1.73	1.00	9.00
Household size	5,895	5.86	3.09	1.00	34.00
milieu (Rural=1)	5,895	0.75	0.43	0.00	1.00

ECONOMIC EFFECTS OF CLIMATE CHANGE AND FOOD INSECURITY IN NIGER[1]

Niger's exposure to recurrent shocks, including climate shocks, increases its vulnerability to food insecurity. This paper aims to quantify the combined effects of climate shocks and food insecurity on key economic variables and identify the most effective mitigation policy responses using a general equilibrium model. Results indicate that rural households would be the most affected by a climate shock resulting in a decline in domestic agricultural production, which would reduce their consumption, erode their capital, and thus increase urban-rural inequalities. Simulations show that cash transfers and the reduction of internal mobility costs appear to be more effective in mitigating the impact on households of a climate shock on agricultural production.

A. Background

1.   As a result of global warming, Niger is subject to frequent climate-related shocks in the form of protracted droughts or floods episodes as well as locust attacks often leading to food crises. Over the past two decades, the country has notably experienced nine episodes of acute drought and five major floods which have mainly affected rural populations and the agricultural sector—the country's largest sector of activity (36.4 percent of GDP in 2021), mostly relying on rainfed crops. Niger endures on average a food crisis every four years due to the vulnerability of its agriculture to climate hazards and its low productivity.

2.   Niger's malnutrition and access to food indicators are among the worst in the world (Figure 1). Although in decline from 53.5 percent in 2000 to 44.4 percent in 2021, the rate of chronic malnutrition in Niger (measured by the percentage of stunted children under five) remains one of the highest in sub-Saharan Africa and the highest of the Sahel countries. The rate of acute malnutrition (measured by the percentage of wasted children under 5), equally down from 15.8 percent in 2010 to 11.5 percent in 2021, is still almost double the average for sub-Saharan African countries and the highest of the Sahel region. The same unfavorable trends are observed regarding the prevalence of children underweight.

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3.   Strengthening the country's food security exclusively through increased food staple

**imports appears challenging and unsustainable.** The dependency rate to food imports stood around 15 percent of the country's net food supply value in 2020. Widespread poverty, a narrow export base as well as the country's remoteness and the fact that it is landlocked—on the fringes of major international supply chains—are significant impediments to access to lower cost imports to fill shortfalls in domestic

Figure 1. Niger: Malnutrition Indicators, 2021 (percentage of total children under 5)

Source: World Food Program stats, and IMF staff calculation

food production when they arise and compound the country's vulnerability to food crises. Moreover, this vulnerability is exacerbated by a large weight of food in household consumption basket, low storage capacity, and the spillovers of Russia's war in Ukraine on the rising costs of agricultural inputs (energy, fertilizers, etc.).

4.   Climate shocks and ensuing food insecurity compromise Niger's macroeconomic stability and weaken its long-term growth potential. Climate shocks create ample volatility in agricultural production and GDP as well as increased inflationary pressures. As a result of lower income and rising food prices, large swaths of the population are at risk of falling into precariousness and poverty. In addition, the roll out of authorities' relief plans and increased demand for imported foodstuff would widen the fiscal and current account deficits. Food insecurity also reduces the productivity of rural populations, eroding their physical and human capital, and thus undermines the country's long-term growth.

5.   The objective of this paper is twofold: (i) quantify the combined effects of climate shocks and food insecurity on key economic variables and (ii) identify the most effective mitigation policy responses using a general equilibrium model of the Nigerien economy. The following section presents the model and the results of the simulations in more detail. The last section discusses public policy recommendations to better mitigate the effects of food crises in Niger.
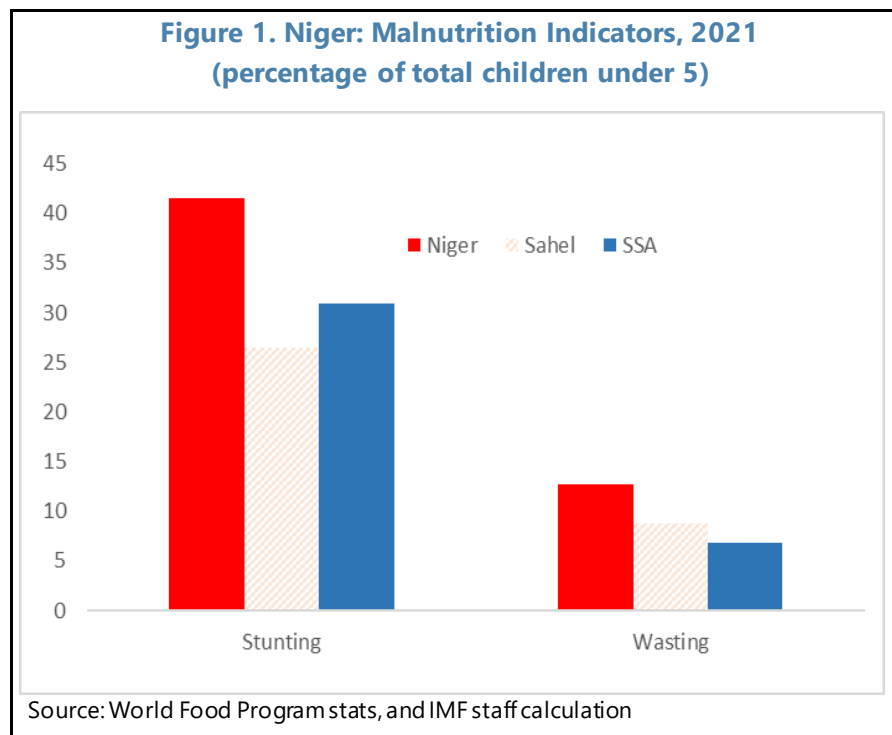
B. Methodology and Simulations

Methodology

6.   A dynamic quantitative open economy spatial multi-sector macroeconomic model[2] is used to analyze the economic effects of climate shocks and food insecurity in Niger. The model features both rural and urban locations. Food is produced in rural areas on household farms using labor, imported fertilizer, and capital. Urban areas specialize in non-farm activities, especially services and industry. Economic agents can trade and migrate across regions (with relative wages declining in the region where people are migrating to) subject to frictions and can import from abroad. Three features, prevalent in low-income countries, are included in the model: (i) subsistence consumption of food (which implies that households spend relatively more on food when incomes fall); (ii) limited access to finance (which introduces a trade-off between consumption today and

production later); and (iii) high transportation costs and import tariffs (which results in limited internal mobility of labor and goods. Incorporating these frictions in a dynamic setting with important sources of spatial and income heterogeneity allow the model to consider the macroeconomic implications of food insecurity.

Figure 2. Niger: Spatial Multi-Sector Macroeconomic Model

7.   Climate shocks are modeled as a one-period temporary 25 percent decline in agricultural productivity—equivalent to two standard deviations of agricultural output.[3] In order to simulate the effects of climate change on food insecurity, the model's output is directly linked to households' food consumption and the corresponding total number of calories. Furthermore, the model allows us to quantify the effect of climate shocks on (i) rural households' capital level, (ii) migration, (iii) urban/rural inequality, and (iv) food prices (domestic and imported). When hit by a negative agricultural shock, households may sell productive capital to meet a minimum food consumption requirement. If the shock is small and isolated, the economy adjusts relatively quickly. Rural households only temporarily migrate to urban areas; and these adjustments are easier when trade and migration frictions are small. However, If the shock is large, the household will give up substantial productive capital to meet the subsistence food requirement. In this case, the effects could be more persistent as the household will need

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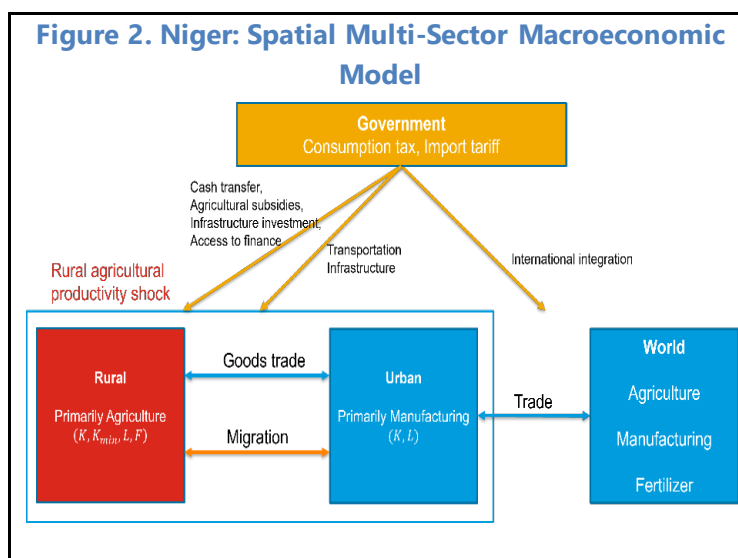
[2] The model is derived from Baptista, D., Spray, J. and Unsal, D.F. (2022). A Macroeconomic Spatial Model of Food Insecurity in Low-Income Countries.

[3] The main parameters of the model have been calibrated using the national survey ECHVM 2018/19 database, FAO stats, and literature findings.

several periods to rebuild the capital needed to operate a productive farm again and would be more likely to migrate to work in non-farm sector to make up for farm income shortages. A household facing lower farm production causes an aggregate "food price" pecuniary externality, as nationwide food shortages and rising prices increase the likelihood that other households will also be food insecure. The result is a permanent decline in agricultural production, higher food prices, lower food consumption, migration to urban areas, increased regional inequality, lower economic growth and productivity.

8.   The model enables an assessment of the comparative effectiveness of various policy responses in mitigating the effects of the shock on households. These policies include:
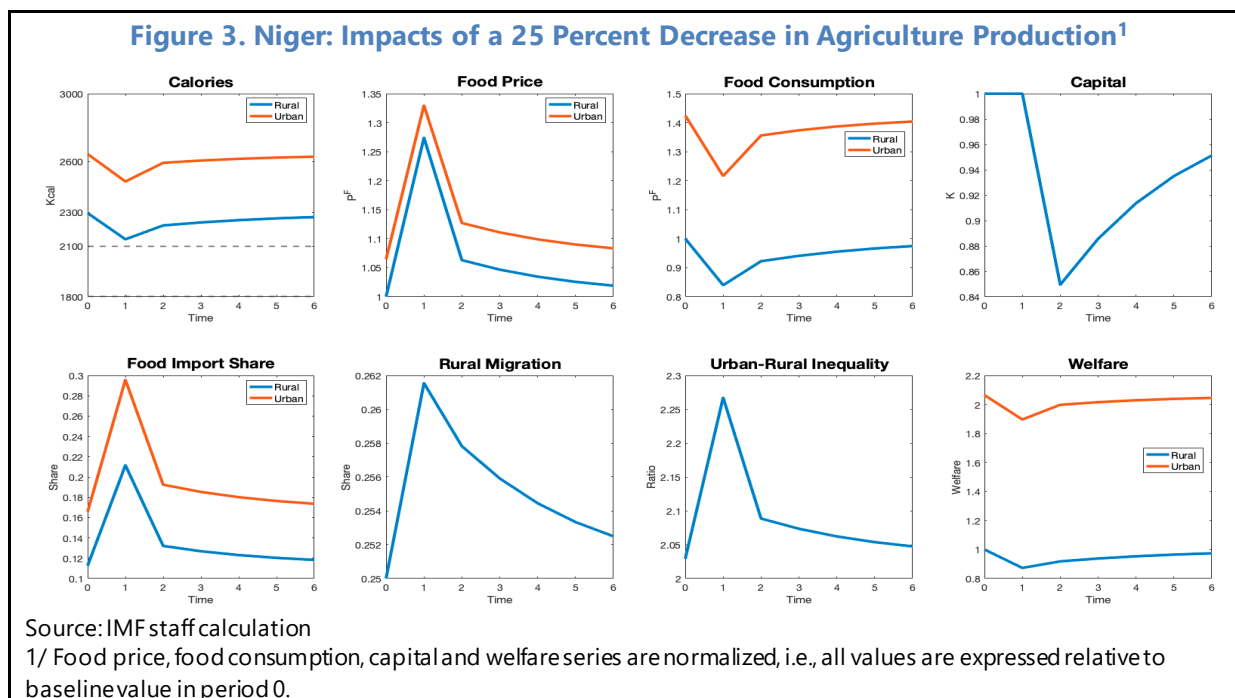
- ***Cash transfers***: under this policy, the government taxes all households (urban and rural) up to 15 percent of their income and redistribute the revenue through cash transfers to rural households who are considered more vulnerable. The cash transfers scheme is considered well-defined by specifying beneficiaries/vulnerable groups to reduce leakages and increase the effectiveness of the transfers.

- ***Fertilizer subsidies*** consist of subsidizing rural households purchases of fertilizer inputs for agricultural production. This policy is financed in the same way as cash transfers.

- ***Trade liberalization*** involves eliminating import tariffs on staple food with aiming to support domestic food supply.

- ***Reduction in internal mobility costs*** implies the removal of mobility barriers between rural and urban areas. Households, goods, and services can therefore easily move from one locality to another at a lower cost. This policy not only reduces the vulnerability of localities to food shortages, but also facilitates the temporary migration of households to other localities to gain additional income in bad times.

Simulations

9.   Rural households would be the hardest hit by a drop in agricultural production caused by a climate shock (Figure 3). Their food consumption would decline following the shock by 18 percent against 14 for urban households, as the share of domestically produced food staples in their consumption basket is much higher. Also, the increase in food prices would be higher in rural areas (27 percent) compared to urban areas (24 percent) mainly because of relatively higher consumption of imported foodstuff by urban households. As a result, calorie consumption would fall for both groups, but to a larger extent for rural households, which would approach the 2100 kcal/day threshold.[4] This would lead to rising inequality in real consumption between rural and urban localities. In addition, the shock would entail an erosion of rural households' disposable capital (by 15 percent)—only partially rebuilt 5 years later. Indeed, to smooth consumption, rural households

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[4] This threshold corresponds to a minimum food consumption requirement as defined by the FAO.

would sell part of their capital. Urban households, similarly, to their rural counterparts, tend to increase their consumption of imported food in response to the shock.

Figure 3. Niger: Impacts of a 25 Percent Decrease in Agriculture Production[1]

Source: IMF staff calculation

1/ Food price, food consumption, capital and welfare series are normalized, i.e., all values are expressed relative to baseline value in period 0.

10.   Cash transfers appear more effective than fertilizer subsidies at safeguarding households' welfare. Simulations depicted in Figure 4 show that, overall, cash transfers raise consumption and utility for rural households as some of the extra cash is used to buy goods (food and non-food) and accumulate additional capital, which raises farm productivity and lowers food prices and migration as the urban-rural wage gap becomes smaller. In turn, fertilizer subsidies decrease the price of domestically produced food and the share of imported food, due to lower domestic food production cost. However, this policy appears costly on net terms as evidenced by the resulting reduction in welfare for both rural and urban households and the lower level of agriculture capital even relative to the baseline "no policy response" scenario as a result of farmers substituting capital for fertilizers— which have become relatively cheaper. In other words, the marginal cost of reducing household cash-in-hand is higher than the marginal benefit from increased fertilizer usage. In contrast, households have various options to use the cash transfer, which include not only purchasing fertilizer but also smoothing their consumption, and accumulating capital.

Figure 4. Niger: Cash Transfer vs Fertilizers Subsidies[1]
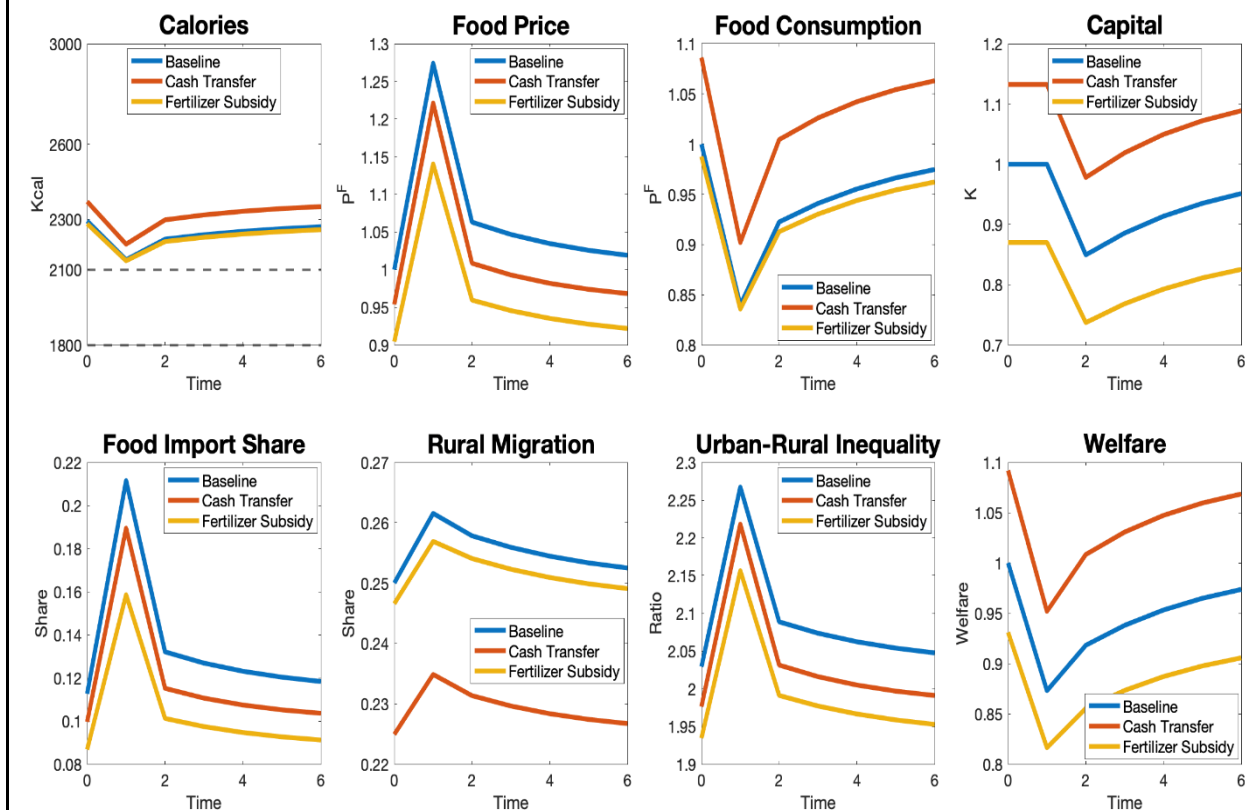
Source: IMF staff calculation

1/ Food price, food consumption, capital and welfare series are normalized, i.e., all values are expressed relative to baseline value in period 0. For simplification purpose, results are shown only for rural households.

11.   Reducing mobility costs appears more effective than lowering import tariffs to mitigate the effects of climate-related food insecurity shocks on households. Figure 5 shows that the distance between total calories consumed, and the critical requirement threshold is larger in the low internal mobility cost scenario than in the trade liberalization scenario. Although the reduction in import tariffs is expected to supplement the domestic food supply by increasing food imports, its gains are not evenly distributed between urban and rural areas. Urban households benefit slightly more from this policy, as their consumption basket include a larger share of imported food. This leads to increased inequality between urban and rural areas, while in the low internal mobility cost scenario, inequality is relatively lower because farmers have access to urban areas and additional opportunities to increase their income, consumption, capital, and welfare.

Figure 5. Niger: Trade Liberalization vs Low Internal Mobility Cost[1]

Source: IMF staff calculation
1/ Food price, food consumption, capital and welfare series are normalized, i.e., all values are expressed relative to baseline value in period 0. For simplification purpose, results are shown only for rural households.
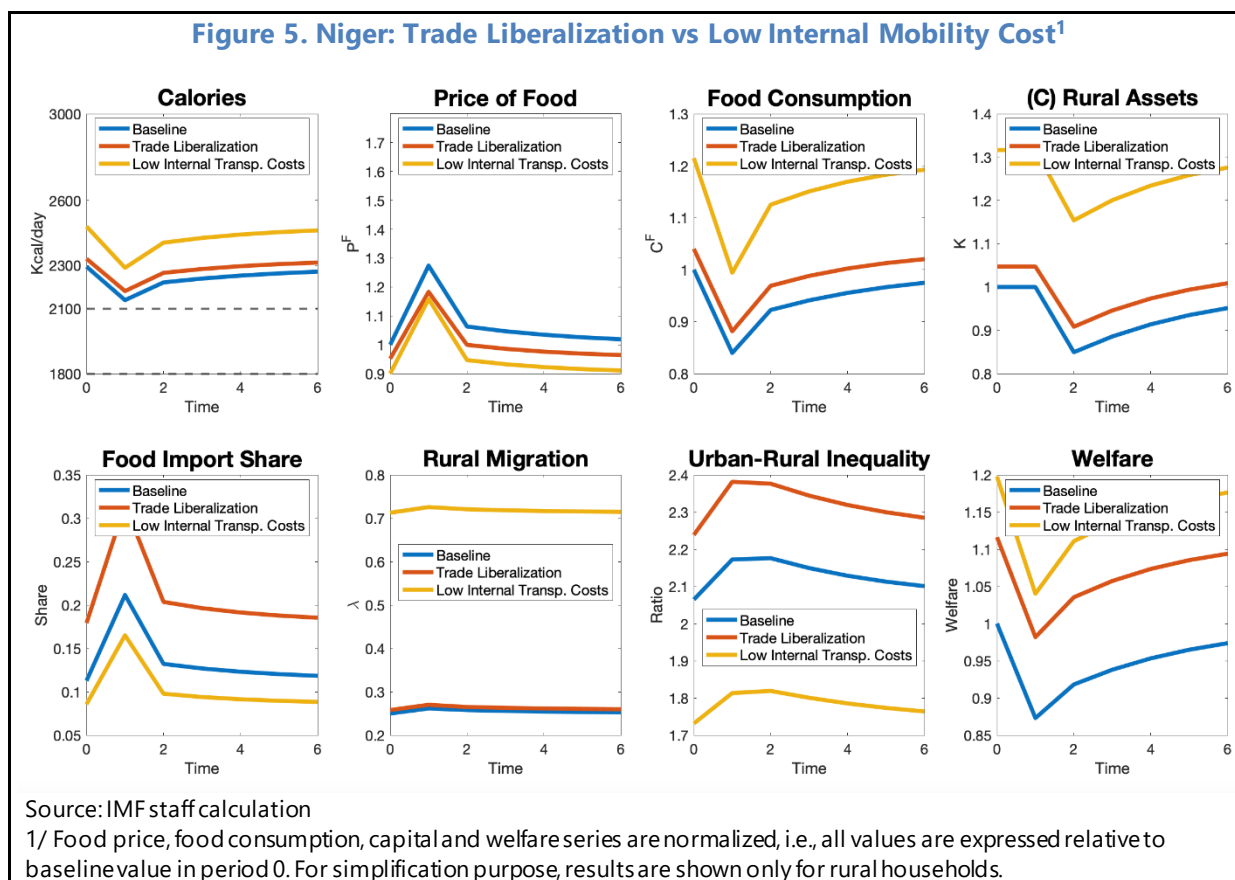
C.   Policy Recommendations

12.   Given the positive effects of cash transfers on welfare illustrated in the model simulations, there is an urgent need to operationalize, on a larger scale, a better coordinated national social safety net system (*See SIP #1 on Social Spending Efficiency*) . This would particularly imply:

- Strengthening the technical and financial resources of the National Mechanism for the Management and Prevention of Food Crises (DNPGCA) to improve its capacity to forecast and manage food crises and coordinate donor interventions.

- Improving safety net programs coordination through the development of a unified social registry and the establishment of common monitoring schemes to reduce fragmentation and overlaps. As a prerequisite, the government should improve the coverage and security of the existing civil registry scheme.

- Increasing safety net spending while improving the mix between long-term, predictable transfers, and shock responses. Directing three-quarters of safety net spending to long-term, predictable transfers to the chronically food insecure and/or chronically poor would help them

smooth consumption, increase resilience, build human capital, and reduce the need for shock response interventions.

13.   Food sales at moderate (subsidized) price and agricultural fertilizer subsidy systems should be reformed to improve their targeting, efficiency, and sustainability. Although subsidies have lower welfare gains compared to cash transfers, they could significantly decrease inequality and the price of domestically produced food as well as food imports (a key dimension of food security). Moreover, when a solid cash transfer system is not yet established, a well-designed and targeted subsidies scheme could contribute to reinforce people resilience to shocks. In this regard, the establishment of a unified social registry will pave the way for the reform of the current system of subsidized food sales, which does not target the most affected and vulnerable populations in food crisis situations. This reform should also extend to the fertilizer subsidy system (CAIMA), including its financing mechanism to ensure its sustainability by the establishment of a revolving fund replenished with sales profits.

14.   Improving financial inclusion of the most vulnerable populations, including women and youth, is key to strengthen their resilience to climate shocks. Access to the formal financial system for these populations will help smooth their consumption and increase their investments to reinforce their physical and human capital and improve their resilience to shocks. Financial inclusion would play the same role as a cash transfer system in easing households budget constraints before and after shocks[5], with the difference that (i) it is not costly for urban households and (ii) could have positive long run effects. While the cost of cash transfers for urban households is permanent over time through taxation, financial inclusion could have positive effects in the long run by allowing people to self-finance their resilience to shocks through access to credit (without waiting for any assistance from the Government). In the context of Niger, key areas of reform include (SIP on Financial Inclusion in Niger):

- Improving financial literacy.

- Promoting digital financial services.

- Advancing the operationalizing the Financial Inclusion Fund.

- Re-establishing a healthy and solid microfinance sector.

- Strengthening supervision is necessary to preserve the stability of the financial system and build costumer's trust.

15.   Increasing investment in road and information technology infrastructure to lower internal mobility costs and open up agricultural production areas will also reduce the impact of climate shocks on rural populations. Model simulations suggest that these investments, along

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[5] See the IMF departmental paper on "*Climate Change and Chronic Food Insecurity in Sub-Saharan Africa*": https://www.imf.org/en/Publications/Departmental-Papers-Policy-Papers/Issues/2022/09/13/Climate-Change-and-Chronic-Food-Insecurity-in-Sub-Saharan-Africa-522211.

with tariff reductions on imported food staples[6], would yield large gains by furthering integration between rural and urban areas in goods and labor markets. Moreover, these investments have the ability to facilitate rural populations access to basic social services—health, education, and social protection—needed to strengthen their human capital and thus improve their resilience to shocks. Fostering mobility will also reinforce the functioning of agricultural markets and improve competitiveness in exports to neighboring countries, while allowing rural populations to access imported food substitutes at lower price in the event of a shortage of domestic production. However, there is a trade-off between the two policies in terms of the time horizon of their gains. While the gains on investments in road infrastructure are expected to materialize in the medium term, the removal of import tariffs could be used as a short-term instrument to respond quickly to shocks.

D. A Brief Description of the Model

Overview

The economy is made up of two locations, rural (R) and urban (U), and is populated by L_U urban households and a continuum Ω of rural households of mass L_r. Both types of households consume an agricultural (F) and a non-agricultural good (M).[7] All domestic agricultural production is carried out by rural households who may then either sell their agricultural output to urban households, export it or use it for self-consumption. Households in the urban area only produce non-agricultural goods. Rural households allocate a fixed share of their labor endowment to agricultural production and use the remaining share to supply wage labor to a perfectly competitive firm in the non-farm sector. Rural households can decide to supply wage labor in the rural or urban area. Urban households, on the other hand, only supply labor to the non-farm sector firm in the urban area and are not allowed to move outside the urban area. Both agricultural and non-agricultural goods can be imported from and exported to a foreign economy denoted by the rest of the World (ROW).

Consumption and Saving

Households residing in location $i = 1, ..., N$ have preferences over a final good C_t and net period savings B_{it} represented by the utility function

$$U_t = \log(C_{it} - \bar{C}) + \beta \log B_{it+1}. \tag{1}$$

Households maximize the utility function above by choosing optimal consumption and savings subject to the per-period constraint $P_{it}C_{it} + B_{it+1} = Y_{it} + (1 - \delta)B_{it}$, where Y_{it} is current household

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[6] In response to this year's food crisis, the government reduced tariffs on some imported food products (e.g., vegetable oil, sugar, rice, etc.) to ease pressure on food prices.

[7] The non-agricultural good encompasses all goods produced off-farm, which includes both manufacturing and service sector goods. In our framework, the agricultural sector should be thought of as including not only the production of staple and cash crops but also livestock rearing. We equate the agricultural sector to the food sector.

income, P_{it} is the price of the final consumption good, and $(1-\delta)B_{it}$ is the net of depreciation stock of savings carried over from the previous period, with $0 < \delta < 1$. Y_{it} is defined as household net income which consists of gross income minus income tax paid plus cash transfers received, i.e. Y_{it} = $Y^{gross}(1-tax_t) + cash_{it}$.

We introduce a consumption requirement $\bar{C}$ to capture the notion that households must consume a minimum amount of goods (a mix of agricultural and non-agricultural goods) to satisfy their basic needs. Importantly, the consumption requirement generates a consumption smoothing motive so that if income falls temporarily in the current period the household reacts by decreasing their savings rate, i.e. by allocating a larger share of wealth $W_{it} \equiv Y_{it} + (1-\delta)B_{it}$ towards current consumption. The opposite happens under a temporary income windfall. Note, however, that under a permanent income increase the household reacts by increasing the savings rate. Intuitively, the higher income allows the household to move away from the consumption constraint and save at a rate closer to the "ideal" savings rate $\beta / (1 + \beta)$.

The household will optimally select to spend a nominal amount Xit on goods consumption given by

$$X_{it} = \overline{P}_{it}\overline{C} + \frac{1}{1+\beta}\left(Y_{it} + (1-\delta)B_{it} - \overline{P}_{it}\overline{C}\right),$$

where P_{it} is the price of purchasing the minimum consumption bundle. The remaining amount of household wealth will be saved, i.e.

$$B_{it+1} = \frac{\beta}{1+\beta}\left(Y_{it} + (1-\delta)B_{it} - \overline{P}_{it}\overline{C}\right).$$

The savings rate sav$_{it}$ is therefore given by sav$_{it}$ = $[\beta/(1+\beta)](1 - P_{it}C/W_{it})$ and is increasing in wealth.

The final goods consumption bundle C$_{it}$ is made up of agricultural and non-agricultural goods. Here, again, we introduce a subsistence requirement but this time for food consumption $\overline{C^F}$ to capture non-homothetic preferences in the final goods bundle. Note the important distinction between $\bar{C}$ and $\overline{C^F}$. The first is an upper-tier consumption requirement that introduces non-homotheticity in final goods consumption vs savings preferences, while the second is a lower-tier consumption requirement that introduces non-homotheticity for agricultural vs non-agricultural goods preferences. Thus, preferences for the final good are described by the Stone-Geary utility function

$$C_i = \left(C_i^F - \overline{C}^F\right)^\alpha \left(C_i^S\right)^{1-\alpha} \quad , \text{ with } 0 < \alpha < 1, \tag{2}$$

where we omit the time subscripts for simplicity. Households take the price of the agriculture good P_i^F and non-agriculture good P_i^S as given and maximise function (2) subject to $P_i^F C_i^F + P_i^S C_i^S = P_i C_i$, where $P_i C_i$ is total household spending on goods. This problem yields optimal food (or agricultural) consumption.

$$C_i^F = \overline{C}^F + \alpha \frac{\left(P_i C_i - P_i^F \overline{C}^F\right)}{P_i^F} \tag{3}$$

Calorie consumption kcal_{it} has a constant elasticity of substitution relation with food consumption so that $kcal_{it} = a(C_{it}^F)^\zeta$, where $0 < \zeta < 1$ and a is a constant.

We assume households always spend enough to satisfy the food subsistence requirement, i.e.

$P_i C_i \geq P_i^F \overline{C}^F$, for all households. For non-agriculture, optimal consumption is

$$C_i^S = (1 - \alpha) \frac{\left(P_i C_i - P_i^F \overline{C}^F\right)}{P_i^S} \tag{4}$$

Optimal consumption implies the final goods consumption price index

$$P_i = \zeta (P_i^F)^\alpha (P_i^S)^{1-\alpha} \tag{5}$$

where $\zeta \equiv \alpha^{-\alpha}(1 - \alpha)^{-(1-\alpha)}$ is a constant. We assume households derive utility from consuming different local varieties of goods and define the Armington aggregator with elasticity of substitution σ, with $\sigma > 1$

$$C_i^j = \left(c_{iR}^{j\,\frac{\sigma-1}{\sigma}} + c_{iU}^{j\,\frac{\sigma-1}{\sigma}} + c_{iROW}^{j\,\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}} \text{, for } j = \{F,S\} \tag{6}$$

where c_{in}^F denotes food goods imported into $i = \{U,R\}$ from location $n = \{U,R,ROW\}$. The urban area produces only non-agricultural goods and so $c_{iU}^F = 0$ for all $i = \{U,R\}$. The Armington aggregator implies the CES price index:

$$P_i^j = \left(p_{iR}^{j\,\frac{\sigma-1}{\sigma}} + p_{iU}^{j\,\frac{\sigma-1}{\sigma}} + p_{iROW}^{j\,\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}} \tag{7}$$

where p_{in}^j is the price of sourcing goods from location n into i. Shipping goods from one location to another incurs an iceberg trade cost τ_{in} for any pair n,i with $\tau_{in} \geq 1$ and $\tau_{ii} = 1$ for all i, n. The price of importing goods from abroad, p_{ROW}^j, is exogenously determined. The net price of goods imported into i from n will equal factory gate prices in n plus a transportation cost τ_{in}, so that

$$p_{in}^j = \tau_{in}\, p_n^j \tag{8}$$

One can show that the wholesaler will optimally choose to source goods according to the import share equation:

$$\pi_{in}^{j} \equiv \frac{p_{in}^{j} c_{in}^{j}}{X_i^j} = \frac{\left(p_n^j \tau_{in}\right)^{1-\sigma}}{\sum_{n'=\{R,U,ROW\}} \left(p_{n'}^{jF} \tau_{in'}\right)^{1-\sigma}} \tag{9}$$

where π_{in}^{j} is the share of expenditures X_i^{jF} spent on purchasing goods from origin n and $\tau_{i,ROW}$ is the cost of importing goods from abroad into i. The share of expenditures from location n falls with farm-gate price p_n^j and shipping cost τ (or $\tau_{i,ROW}$ from imports) and rises with the CES price index P_i^j. In other words, more is purchased from origin n whenever sourcing goods from there becomes relatively cheaper than the cost of final food goods bundle C_i^{jF}.

Agricultural Production

Each rural household has access to a plot of land of size h which they use to produce an agricultural good according to the production function

$$q_t^F = h\left[z_t k_t^\gamma f_t^\theta\right] \quad \text{, with } 0 < \gamma < 1 \text{ and } 0 < \theta < 1 \tag{10}$$

where z_t is farm productivity, k_t is installed farm capital and f_t is fertilizer input. Capital should be interpreted in a broad sense so as to include a wide range of productive inputs like, seeds, tools, machinery, irrigation and livestock. All rural households supply the same fixed amount of labor to their total farm production, which we set equal to $0 < \rho < 1$. Households allocate their savings across the two productive factors so that their marginal productivity is equalized, i.e.

$$\frac{k_t(\omega)}{f_t(\omega)} = \frac{\gamma}{\theta} \frac{p^f}{p^k} \tag{11}$$

where p^f and p^k are the prices of fertilizer and capital, respectively. Households are unable to borrow and so installed capital k_t and fertilizer f_t are financed exclusively through the accumulation of household savings. Rural households employ all their savings B_{it} in the form of farm capital and fertilizer and may then decide to either carry over the net-of-depreciation capital stock to the next period or sell it off to finance current consumption. Contrarily to capital, fertilizer depreciates fully in each period. All capital goods and fertilizer are imported from the foreign economy.[8]

Non-agricultural Sector

In both the urban and rural areas there is a perfectly competitive firm that produces non-agricultural goods by hiring labor from households. In the rural area, only rural households are hired. Production is given by the linear production technology:

$$Q_{Rt}^M = z_R^M \left(\psi_t(1-\rho)L_{Rt}\right) \tag{12}$$

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[8] This is a simplifying assumption we make to avoid adding a block of equilibrium conditions for capital goods. This assumption is arguably consistent with many low-income economies in which farm inputs like fertilizer, seeds and animal feed, as well as tools and machinery are largely sourced from abroad

where ψ_t is the share of rural households who decide to stay in the rural area. The remaining portion $(1 - \psi_t)$ migrates to the urban area for wage work and so production in the urban area is given by

$$Q_{Ut}^M = z_U^M [L_U^U + (1 - \psi_t)(1 - \rho)L_U]$$

(13)

where z^M is local non-agricultural TFP. Households earn wage rate w_{it}. In equilibrium, firms make zero profits or, equivalently, the marginal revenue product of labor is set equal to the wage rate

$$w_{it} = p_{it}^M z_i^M \text{ , for } i = \{R,U\} ,$$

(14)

where p_{it}^S is the price of local non-agricultural goods. The foreign economy ROW has an exogenously set wage rate (and consumption price index) that households take as given.

To incorporate the wage work location choice by rural households, we assume they face the location choice problem

$$V_t(\omega) = \max_{i=\{R,U,ROW\}} \frac{D_i}{\kappa_{it}(\omega)} \frac{w_{it}}{P_{it|R}} \qquad \text{with } D_R > D_n \text{ for any } n = \{U,ROW\} ,$$

(15)

where D_i is the amenity value of location i. The assumption that $D_R > D_n$ for any $n = \{U,ROW\}$ captures moving costs which make rural households more likely to supply labor in the rural area than elsewhere, holding fixed real wages $w_{it}/P_{it|n}$.[9] Term $\kappa_{it}(\omega)$ captures an idiosyncratic work location preference that follows a Frechet distribution with scale parameter 1 and dispersion parameter λ, iid across households and time. The choice of work location will depend on the household's idiosyncratic draws for the costs of temporary migration.

Households that draw a low cost of temporary migration for a given destination will be more likely to exploit spatial differentials in real wages by seeking employment in that location. For other households, the costs will be so high that they will prefer all members to remain in the residence location rather than migrate to another, higher-paying location. The dispersion parameter λ measures the degree of heterogeneity in idiosyncratic location preferences, with $\lambda \to \infty$ representing the extreme case where preferences are fully homogeneous across all households. Lower values of λ correspond to more heterogeneity in personal preferences for locations.

Note that V_t depends on a migration-adjusted real wage. The price index $P_{it|R}$ combines the price indices of rural and destination location according $P_{it|R} = P_{it}^\phi P_{Rt}^{1-\phi}$ with $0 < \Phi < 1$. We employ this migration-adjusted price index to account for the role of remittances.[10] We assume all members of the household pool their income and use transfers to equalize real consumption with some members of the household buying goods at the destination price index P_{it} and the remaining at the origin price index P_{nt}. Parameter Φ governs the relative consumption expenditure at the two

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[9] Moving costs should be interpreted as a combination of different factors that go beyond explicit monetary costs like bus fares. They may also include other important factors such as home-bias amenity preferences and non-monetary costs of moving (e.g., searching for a job or housing)

[10] In many low-income countries one or a few members of a household (typically males) move out in search of temporary work opportunities, who then transfer some of their earnings back to the other, non-migrating, members of the household in the origin location.

locations and we set it equal to the share of migrating household members. To ensure real consumption is equalized across members of the household, migrants send remittances back to their residence location, where the other members of the household live.

Using the properties of the Frechet distribution, one can show that the probability of sending migrants to (or remaining in) location i, ξ_{it}, is given by

$$\xi_{it} = \frac{D_i \left(\frac{w_{it}}{P_{it|R}}\right)^\lambda}{\sum_{m=1}^N D_m \left(\frac{w_{mt}}{P_{mt|R}}\right)^\lambda}.$$

(16)

With the existence of a continuum of rural households, the law of large numbers implies that actual migration flows will match the probability above. This implies that $\xi_{Ut} = \psi_t$. Seen through the expression above, parameter λ controls the size of migration responses to changes in local conditions. A lower λ implies that an increase in wages in i will generate a smaller inflow of migrants into that location. λ therefore governs the elasticity of migration flows with respect to seasonal migration-adjusted real wages. In the extreme case of $\lambda \to \infty$, the elasticity of migration is infinite and indirect utility $V_t(\omega)$ must be equalized for all households. Note that real wages will not necessarily be equalized across locations due to amenity differences.

Market Clearing

In this section we close the model by providing market clearing conditions. To ensure market clearing in goods markets, we impose the condition that sales Y_i^j for $j = \{A, S\}$ must equal the sum of sales across all destinations. First, assume exports to the rest of the world $X_{ROW,n}^{jF}$ are given by a constant elasticity function of prices with elasticity $1 - \sigma$

$$X_{ROW,n}^j = \kappa^j \cdot \left(\tau_{ROW,n}\, p_n^j\right)^{1-\sigma},$$

(17)

where κ^j is a constant. The market clearing condition for goods is then given by

$$Y_i^j = \sum_{n=1}^N \pi_{ni} X_n^j + X_{ROW,i}^j,$$

(18)

which pins down the vector of equilibrium farm-gate price of goods p_i^j for $i = \{R,U\}$. Since markets are perfectly competitive, sales must equal expenditures which must in turn equal total farm sales. We can then write

$$p_i^j Q_i^j = \sum_{n=1}^N \pi_{ni} X_n^j + X_{ROW,n}^j$$

(19)

This expression provides us with a system of equations that pin down equilibrium prices in the market. Given trade shares π_{ni} (which depend on the characteristics of the trade network and the

relative efficiency of each location) and exports $X_{ROW,i}{}^F$, the equation provides the vector of equilibrium goods prices ($p^S{}_U$, $p^F{}_R$, $p^S{}_R$) that are consistent with market clearing. Finally, we assume the government budget is balanced so that tax revenues R_t must equal spending S_t on cash transfers and fertilizer subsidies

$$R_t \equiv \left(L_U Y_{U,t} + L_R Y_{R,t} \right) \cdot \text{tax}_t = L_R(f_{it}\ p^f\, sub_t + \text{cash}_t) \equiv S_t \ , \tag{20}$$

for in all time periods t = {1, 2, ...}. Note we assume that rural households are the sole recipients of government benefits.

FOSTERING EXPORT DIVERSIFICATION IN NIGER[1]

A. Introduction

1.   Diversification in exports and in domestic production has been a long-standing issue in many developing economies. Research has shown that diversification plays critical role in macroeconomic performance. Diversification, measured by variety of export goods or its quality, reduces macroeconomic volatility through enhancing resilience of the economy to shocks to a specific sector and/or trade partner. A series of shocks in recent years, including but not limited to the COVID-19 pandemic, Russian war in Ukraine, and climate-related shocks, have proven the criticality of fostering diversification (UNCTAD 2022).

2.   Diversification is associated with faster economic growth in low-income countries (LICs). Increases in income per capita at an early stage of development are typically accompanied by a transformation in a country's production and export structure. This could include adoption of new products and acquisition of new trade partners, thereby enhancing the degree of diversification. Studies also find that greater diversification in both exports and output, as well as quality upgrading, could enhance growth in LICs (IMF 2014). If diversification occurs through the shift toward higher value products and increase in productivity, it would free-up resources in the economy, which could be allocated to achieve further growth.

3.   In the context of Niger, the country has remained at a low level of diversification with limited number of major trade partners (see Section II). Despite substantial efforts to achieve transformation of the economy, as well as enhancing productivity of the agricultural sector over several years, exports of goods are concentrated in a few primary products in the natural resource and agriculture sectors, such as uranium and oil. The export structure, coupled with limited number of major trade partners, leaves the economy subject to commodity price and climate-related shocks, which are inherently volatile. While the prospective onset of crude oil exports through a new pipeline represents a favorable growth opportunity, there remains a risk of further concentration of exports unless effective efforts toward diversification are made.

4.   Against this backdrop, this selected issue paper (SIP) investigates the drivers of diversification and explores the potential for fostering diversification in Niger. The literature has pointed out the importance of horizontal policies in fostering diversification (e.g., Giri et al. 2019; Salinas 2021). These horizontal policies include education, infrastructure, institutional quality, removal of trade barriers, and access to financing. We construct a county-by-year panel dataset and estimate panel regressions with a particular focus on horizontal policies. Based on these empirical results, we then discuss potential policies to foster diversification in Niger. Given the slow-moving
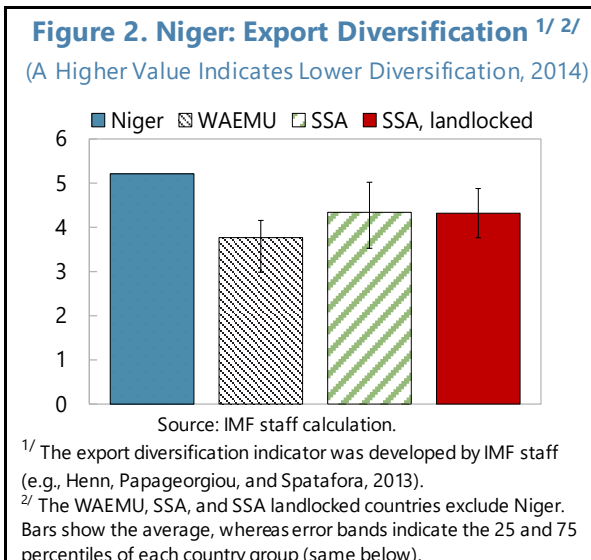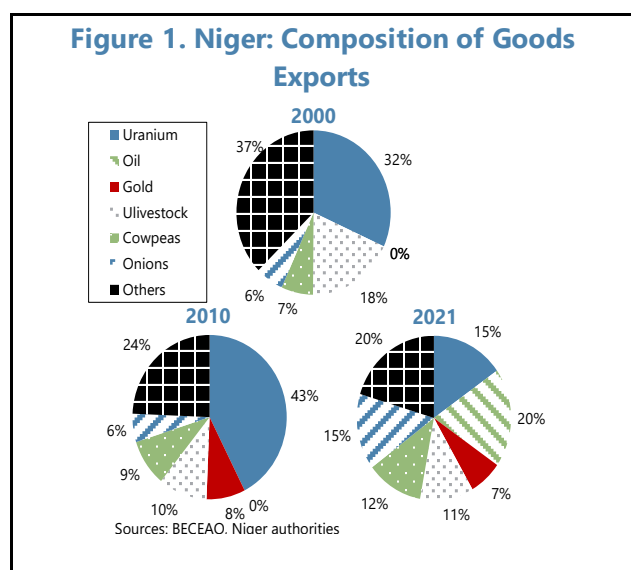
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[1] Prepared By Rasmane Ouedraogo (Resident Representative) and Tomohide Mineyama (SPR). Canghao Chen (AFR) provided research assistance.

nature of the outcomes of reforms linked to these horizontal policies (e.g., education), recommendations mostly focus on medium- and long-run perspectives.

5.   **The remainder of the SIP is organized as follows.** Section II presents stylized facts regarding export structure and degree of diversification in Niger. Section III conducts an empirical analysis to explore the driver of exports diversification in cross-country data. Section IV discusses the potential of Niger's export diversification and policy recommendations.

B. Stylized Facts

6.   **Niger's exports have been concentrated on a few primary products in natural resource and agriculture sectors (Figure 1).** Historically, uranium had been the largest export product as Niger has one of the richest reserves of uranium in the world, located in the northern east area of the country. With the discovery of oil fields in the early 2010s, oil has become a major export product, and also benefited from the recent global price surges. Other export goods include gold, which has boomed in recent years in the Burkina-Mali-Niger triangle area, and a few agriculture and livestock products. With the limited variety of exports products, the degree of export diversification remains lower compared to the average of other WAEMU and Sub-Saharan African (SSA) countries (Figure 2). Among SSA, landlocked countries do not display a significantly different level of export diversification.

Figure 1. Niger: Composition of Goods Exports

Sources: BCEAO. Niger authorities

Figure 2. Niger: Export Diversification [1] [2]
(A Higher Value Indicates Lower Diversification, 2014)

Source: IMF staff calculation.
[1] The export diversification indicator was developed by IMF staff (e.g., Henn, Papageorgiou, and Spatafora, 2013).
[2] The WAEMU, SSA, and SSA landlocked countries exclude Niger. Bars show the average, whereas error bands indicate the 25 and 75 percentiles of each country group (same below).

7.   **There is also concentration in export partners, mainly linked to specific natural resource exports (e.g., Uranium to France) and neighboring countries (Table 1).** The exports to WAEMU and other ECOWAS countries composing of a half of total exports, with Nigeria accounting

for a quarter of the total exports, followed by Mali and Burkina Faso.[2]

8.   As a consequence, the economy has been built on a narrow export base. The exports-to-GDP ratio has been among the lowest in WAEMU and Sub-Saharan African (SSA) countries (Figure 3). The ratio has been somewhat stable in the past decades, though affected by global commodity prices. This fact implies that despite the steady increase of exports in recent years, including the discovery of oil fields, its pace has not exceeded overall economic growth.

Table 1. Niger: Top 10 Export Destinations [1/] (2016-20 Average)

Rank	Country	Export share (percent of identified export)
1	France	26.3%
2	Nigeria	25.6%
3	Mali	11.3%
4	Burkina	5.6%
5	Benin	4.0%
6	USA	3.5%
7	UAE	3.4%
8	Ghana	3.3%
9	Togo	2.0%
10	Canada	1.3%

Source: BCEAO, IMF staff calculation.
1/ WAEMU and other ECOWAS countries are shaded.

9.   The onset of crude oil exports through a new pipeline is expected to ramp up exports in coming years, while perhaps increasing the risk of increasing export concentration further. The completion of a new oil pipeline through Benin is expected by late 2023, reaching its full operation in 2024. The onset of oil exports through the pipeline is expected to push the export-to-GDP ratio to around 25 percent in the medium term (Figure 3). The expected increase in oil-related revenue would also create fiscal space to increase physical and human capital spending, thereby fostering the basis for export diversification. Nevertheless, a higher degree of oil dependence would make the economy more vulnerable to global oil price fluctuations.

Figure 3. Niger: Export-to-GDP Ratio
(Percent of GDP) [1/]
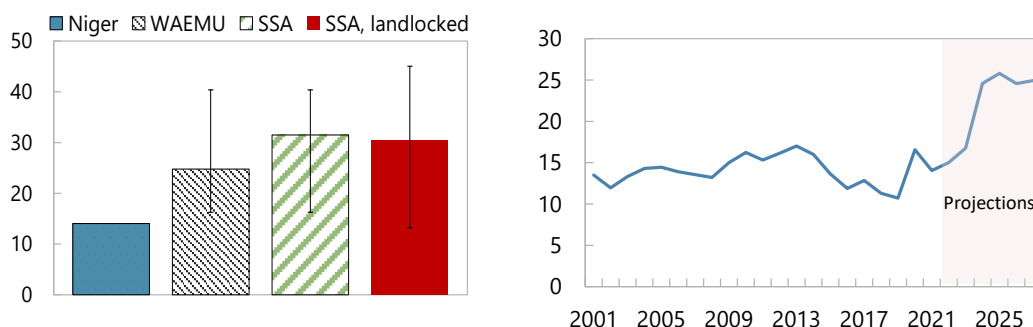
Source: IMF staff calculation.
1/ Left chart is the ratio in 2021.

10.   Various indicators reveal dauting challenges for implementing horizontal policies to foster diversification in Niger. Key areas of horizontal policies, which would serve as a basis of fostering export diversification, including human capital development, financial sector development,

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[2] Though trade with Nigeria has declined after its border closure in 2019, it resumed according to the latest available data.

trade liberalization, and infrastructure, are underdeveloped compared to other WAEMU and SSA countries (Figure 4).[3] The low level of human development is partly attributable to shorter average schooling years. The financial development index identifies Niger's limited depth of and access to financial intermediaries, as well as the lack of developed financial markets. The degree of trade openness, measured by trade regulations, taxes, tariffs, and trade agreements, also fall behind the WAEMU and SSA's average. Regarding infrastructure, digitalization and informational development, including internet access, are also key to foster trade activities. Regarding governance, regulatory quality and control of corruption in the Worldwide Governance Indicators are lower than the WAEMU's regional average and are in a similar level to the SSA average, while there are sizable confidence intervals and cross-country variations.

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[3] To have quantitative indicators for more countries and dimensions, and following previous studies, we here employ data from the World Bank Human Capital Project, the financial development indicators developed by IMF staff, KOF Globalization Index, and the Worldwide Governance Indicators. Most of these data are perception based and thus more subjective than other economic indicators. Specific descriptions of indicators used are described in the figure.

Figure 4. Niger: Selected Indicators of Horizontal Policies

Human Capital Index [1]
(as of 2020)
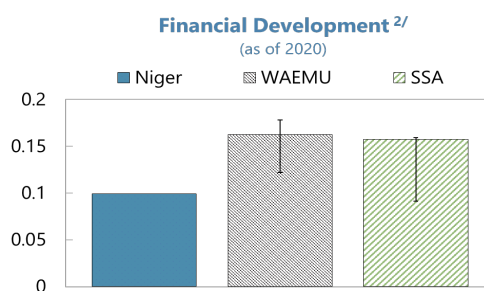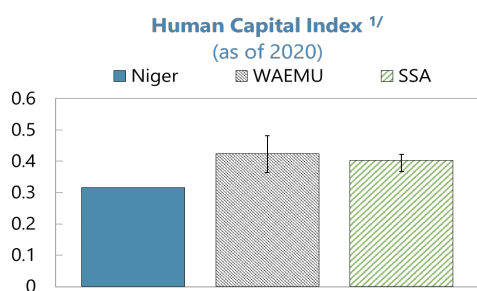
Source: World Bank Human Capital Project.
1/ The human capital index is calculated based on the probability of survival to age five, expected years of school, harmonized test scores, learning-adjusted years of school, fraction of children under five not stunted, and adult survival rate.

Financial Development [2]
(as of 2020)

Source: IMF staff calculation, Sahay, R., et al. (2015).
2/ The financial development indicator is composed of nine indices that summarize how developed financial institutions and financial markets are in terms of their depth, access, and efficiency.

Trade Globalisation [3][4]
(as of 2019)

Informational Globalisation [3][4]
(as of 2019)
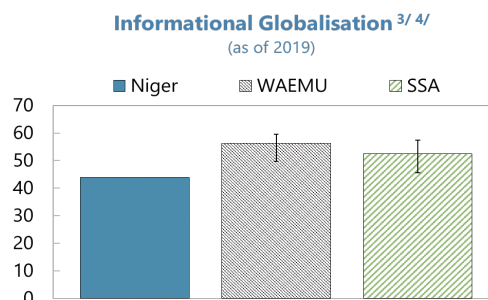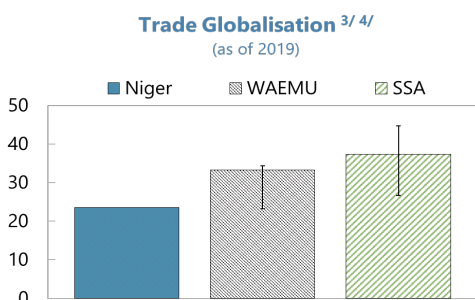
Source: KOF Globalization Index, Gygli, S., F. Haelg, N. Potrafke and J. E. Sturm (2019).
3/ The trade globalization index is calculated based on trade regulations, trade taxes, tariffs, and trade agreements. Informational globalization index is calculated based on television access, internet access, and press freedom.
4/ Use of these indicators should be considered carefully, as they include perceptions-based data. Error bands for WAEMU and SSA indicate the 25 and 75 percentiles of each country group excluding Niger.

Regulatory Quality [5][6]
(as of 2021)

Control of Corruption [5][6]
(as of 2021)
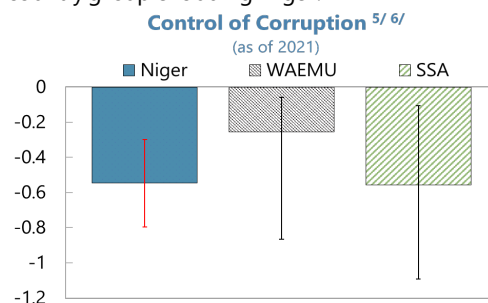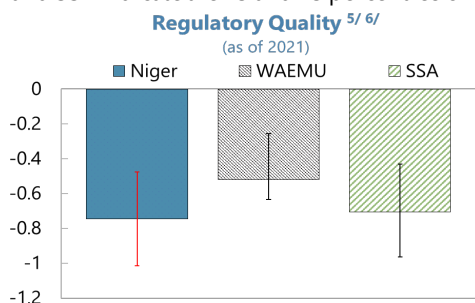
Sources: Worldwide Governance Indicators, D. Kaufmann (Natural Resource Governance Institute and Brookings Institution) and A. Kraay (World Bank), 2021.
5/ The Worldwide Governance Indicators (WGI) are a research dataset summarizing the views on the quality of governance provided by a large number of enterprise, citizen and expert survey respondents in industrial and developing countries. These data are gathered from a number of survey institutes, think tanks, non-governmental organizations, international organizations, and private sector firms.
6/ Use of these indicators should be considered carefully, as they are derived from perceptions-based data. Error bands for Niger are for a 90 percent confidence interval. Confidence intervals for peer group averages are negligible. Error bands for WAEMU and SSA indicate the 25 and 75 percentiles of each country group excluding Niger.

C. Empirical Analysis: What Matters for Exports Diversification and Quality? An Econometric Approach

11.   This section conducts an empirical analysis to explore what matters most for achieving diversified exports base. It uses econometric models to investigate the key determinants of exports diversification[4] and quality in a global sample of 151 countries covering 1980-2014.

Methodology

12.   To address this question, the empirical methodology follows the literature on the determinants of exports diversification. To this end, the following equation is estimated:

$$ExpDiv_{it} = \alpha + \alpha ExpDiv_{it-1} + \beta X_{it-1} + \pi_t + \mu_i + \varepsilon_{it} \quad (1)$$

where $ExpDiv_{it}$ denotes the index of exports diversification of country i, at time t. The index of exports diversification is estimated based on various economic and financial characteristics. μ_i stands for country-fixed effects to capture time-invariant country characteristics; π_t are time-fixed effects to control for common shocks across countries; and ε_{it} is the error term. The vector X_{ijt} represents a set of control variables, including the following: natural resource rents in percentage of GDP, the size of the informal sector (in percent of GDP), the indices of financial development, trade liberalization, control of corruption, human capital, quality of trade and transport related infrastructure, quality of ICT and electricity infrastructure, investment profile, and global competitiveness. It also includes the index of state fragility and digitalization. Finally, foreign direct investment (in percent of GDP) and domestic private investment (in percent of GDP) are included in the estimates. Annex Table 2 lists all variables used in the analysis, their definition and sources, and Annex Table 3 provides the descriptive statistics.

We also explore the determinants of export quality using the following equation:

$$ExpQual_{it} = \alpha + ExpQual_{it-1} + \beta X_{it-1} + \pi_t + \mu_i + \varepsilon_{it} \quad (2)$$

With $ExpQual_{it}$ being the index of export quality of country i, at time t. The remaining control variables are as above in equation (1).

13.   One important caveat is the potential for reverse causality. We use panel fixed effects to obtain the estimates. As evidenced in previous studies, this econometric model does not address the issue of reserve causality between the level of export diversification and several of the control variables, leading to endogeneity bias. To attenuate this problem, all control variables are lagged by one-year and the coefficients associated with each variable should be interpreted as correlations rather than causal effects.

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[4] The index of exports concentration was rescaled to 0 to 1, with 1 being the highest level of export diversification.

Results

14.   The quality of infrastructure is a significant predictor of export diversification and quality (Table 2). The coefficients associated with both the quality of trade-and transport-related infrastructure and the quality of ICT and electricity infrastructure are positive and strongly significant, suggesting that diversifying the export base is associated with improving infrastructure. An increase of the current level of quality of trade-and transport-related infrastructure of Niger (the index was 2 in 2018) to the median of the sample (2.72 in 2018) is associated with an increase in the index of export diversification by 21 percent.

Table 2. Niger: Determinants of Export Diversification

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exports concentration index, Lagged	0.4758***	0.4649***	0.4939***	0.4883***	0.4881***	0.4790***	0.4650***	0.4701***
	(0.040)	(0.041)	(0.043)	(0.038)	(0.044)	(0.043)	(0.041)	(0.035)
Natural resources rents (% of GDP)	-0.0042***	-0.0045***	-0.0042***	-0.0043***	-0.0041***	-0.0043***	-0.0042***	-0.0043***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Informal sector size (% of GDP)	-0.0009	-0.0009	-0.0006	-0.0007	-0.0007	-0.0012*	-0.0008	-0.0003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Financial development index	0.1163***	0.0843**	0.0220	0.0569	0.0561*	0.1099***	0.0912***	0.1125***
	(0.034)	(0.034)	(0.033)	(0.035)	(0.034)	(0.035)	(0.032)	(0.035)
Quality of the regulatory system	0.0009**	0.0007	0.0008*	0.0009**	0.0010**	0.0010**	0.0005	0.0010**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Trade liberalization	0.0327***	0.0190**	0.0233*	0.0122	0.0160	0.0310**	0.0282***	0.0200*
	(0.009)	(0.009)	(0.012)	(0.011)	(0.012)	(0.013)	(0.009)	(0.011)
Control of corruption	0.1417***	0.1471***	0.1612***	0.1534***	0.1470**	0.1713***	0.1581***	0.0879**
	(0.047)	(0.051)	(0.049)	(0.053)	(0.072)	(0.059)	(0.051)	(0.036)
Human capital index		0.1560**						
		(0.076)						
Quality of trade- and transport-related infrastruct			0.0556***					
			(0.018)					
Quality of ICT and electricity infrastructure				0.0213**				
				(0.010)				
Investment profile					0.0492*			
					(0.029)			
Global competitiveness index					0.0383**			
					(0.018)			
FDI (% of GDP)						0.0061*		
						(0.003)		
Domestic private investment (% of GDP)						0.0001***		
						(0.000)		
Digitalization index							0.0013**	
							(0.001)	
State fragility index								-0.0042**
								(0.002)
Constant	0.0667	0.0502	-0.0568	0.0518	-0.0751	0.1172*	0.0495	0.1234**
	(0.052)	(0.061)	(0.073)	(0.070)	(0.121)	(0.068)	(0.057)	(0.049)
Observations	2,230	2,084	2,135	2,058	1,748	1,865	2,230	2,091
Number of countries	151	140	144	138	118	135	151	141
R-sq	0.7621	0.7596	0.7723	0.7878	0.8189	0.7467	0.7587	0.8109

Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

15.   The development of the financial sector is also a key factor to export diversification and quality. The empirical results show that the coefficient associated with the index of financial

sector development is positive and significant In Tables 2 and 3, suggesting that a high level of financial sector development is associated with a high level of export diversification and quality. Firms, in particular new entrants and small-scale exporting companies, need to secure financing to cover the large costs of entering export markets, including information costs, compliance costs and other costs related to trade barriers such as adapting to foreign demand characteristics or tailoring exports to the tastes and standards of local consumers in new markets. For manufacturing firms, additional costs related to investments in plants, machinery or equipment required to export could require more financing from the banking sector. Quantitatively, an increase of the index of financial sector development of Niger (0.1 in 2020) to the median of the sample (0.26 in 2020) would increase the index of export diversification of the country by 9.8 percent and quality by 1.2 percent.

16.   **Good governance is strongly associated with a higher level of export diversification and quality.** Indicators of quality of the regulatory system and control of corruption enter the regressions with the expected positive sign, confirming the important role of governance. The ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development while putting in place measures to combat corruption are essential to improve the business environment and create opportunities to exporting firms. If the indices of quality of the regulatory system and control of corruption of Niger (23 and 27.4 in 2020, respectively) increase to the median of the sample (48.6 and 49 in 2020, respectively), then its index of export diversification would increase by 12.1 and 9 percent, respectively.

17.   **Trade liberalization is correlated with a more diversified export basket and higher quality.** Tables 2 and 3 show that the coefficient associated with trade liberalization is positive and significant, except in columns 4-5, implying that facilitating trade through more liberalization to other markets could broaden the export base and improve export quality. Dornbusch et al. (1977) established that tariff reductions by two trading countries make export baskets of both countries more diversified by expanding the set of traded goods in each country. Trade costs like tariffs and non-tariff trade barriers make some intermediate range of goods non-traded or difficult to trade. A reduction of tariff and non-tariff trade barriers means reduction of trade costs so that some of these non-traded goods can now be traded, and thus consequently expanding the export baskets of involved countries. Krugman (1979) established that opening up of trade leads to larger number of varieties being exported and imported through its pro-competitive effect. If the index of trade liberalization of Niger (23.6 in 2019) reaches the median of the sample (58 in 2019), the index of export diversification of Niger would increase by 15.4 percent and its export quality index by 2 percent.

18.   **A diversified export base and higher export quality are associated with enhanced human capital.** The coefficient associated with the index of human capital is positive and significant in column (2) of Tables 2 and 3. Conquering new markets, creating new products and exporting higher quality of goods require innovation and skilled workforce. Furthermore, an improvement in technical skills could enhance the level of productivity and in turn lead to further expansion of the potential of exporting products. If Niger were to increase its human capital index (0.3) to the median

of the sample (0.6), its index of export diversification would increase by 24.5 percent and export quality by 6.8 percent.

19.   Digitalization is associated with greater diversification through greater dissemination of knowledge. As expected, the coefficients associated with index of digitalization are positive and significant in column (7) of Tables 2 and 3. Building capacity for digital development enhances the country capabilities to promote innovation, create knowledge and disseminate information, which are key to developing and exporting new products. In addition, digital networks increase communication as well as allow people, regions and nations to collaborate and share information aiming at fostering trade. If Niger were to digitalize its economy to the median of the sample (a move from 44 to 75.7 in 2019), its index of export diversification would increase by 21.6 percent and export quality by 3 percent.

20.   Fragile states are more likely to have a narrow export base. The results in Table 2 show that the coefficient associated with the index of state fragility is positive. The destruction of social, human capital and physical infrastructure following outbreaks of conflict hamper economic prospects and capacity of countries to implement policies to diversify their exports. Weak institutional framework would further undermine innovation and investment into productive sectors. A reduction of the level of state fragility of Niger (19 in 2018) to the median of the sample (9 in 2018) is associated with an increase of the index of export diversification by 22 percent.

21.   The dependance on natural resources is associated with a narrow export base and poor export quality. The coefficient associated with the ratio of natural resources rents to GDP is negative and strongly significant at the 1 percent level in all columns of Tables 2 and 3. This result suggests that countries with significant endowments in natural resources tend to have a low level of export diversification and poor quality of exports. These commodities are often exported in raw materials, without significant transformation into diverse products, thus limiting the export base of countries. If Niger were to reduce its reliance on natural resources (rents represented 5.2 percent of GDP in 2019) of to the median of the sample (1.7 percent of GDP in 2019), its index of export diversification would increase by 7.7 percent.

22.   Improved business environment and competitiveness is correlated with export diversification. The results in column (5) of Table 2 show that the coefficients associated with investment profile and the global index of competitiveness are positive and significant, suggesting that better investment climate and enhanced competitiveness could increase export diversification. In environments with a poor investment climate, the lack of domestic competitive suppliers, combined with inefficiencies in factor markets and institutional capacity constraints, hinder economic and export diversification. Providing predictable and transparent business environment and effective enforcement of rules reduce the risks associated with testing new products and markets, enable firms to innovate and invest. Focusing on the investment climate, if Niger improves its index of investment profile (0.37 in 2018) to the median of the sample (0.4 in 2018), its index of export diversification would rise by 1 percent. Such improvement will attract foreign investment, which could further contribute to diversify exports (column 6). Furthermore, domestic investment to

tackle bottlenecks on trade could reduce trade costs and help achieve more diversified export base (column 6).

Table 3. Niger: Determinants of Export Quality

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exports quality index, Lagged	0.5651***	0.5545***	0.5638***	0.5852***	0.6890***	0.6623***	0.5525***	0.5663***
	(0.052)	(0.055)	(0.055)	(0.043)	(0.026)	(0.054)	(0.051)	(0.054)
Natural resources rents (% of GDP)	-0.0020***	-0.0022***	-0.0021***	-0.0022***	-0.0014***	-0.0014***	-0.0020***	-0.0021***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Informal sector size (% of GDP)	-0.0001	0.0001	-0.0001	-0.0002	-0.0002	-0.0004	-0.0001	-0.0003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Financial development index	0.0569***	0.0352*	0.0374	0.0268	0.0269	0.0399**	0.0452**	0.0589***
	(0.020)	(0.020)	(0.027)	(0.024)	(0.019)	(0.017)	(0.020)	(0.021)
Quality of the regulatory system	0.0009***	0.0007**	0.0008**	0.0004	0.0003	0.0008**	0.0007**	0.0006**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Trade liberalization	0.0157*	0.0045	0.0199**	0.0157	0.0031	0.0193**	0.0134*	0.0199*
	(0.008)	(0.008)	(0.010)	(0.010)	(0.008)	(0.008)	(0.008)	(0.010)
Control of corruption	-0.0137	0.0000	0.0014	-0.0071	-0.0251	0.0220	-0.0039	-0.0216
	(0.030)	(0.031)	(0.033)	(0.031)	(0.029)	(0.030)	(0.030)	(0.031)
Human capital index		0.1678***						
		(0.057)						
Quality of trade- and transport-related infra			0.0137					
			(0.013)					
Quality of ICT and electricity infrastructure				0.0142**				
				(0.007)				
Investment profile					-0.0037			
					(0.017)			
Global competitiveness index					0.0121			
					(0.011)			
FDI (% of GDP)						0.0024		
						(0.004)		
Domestic private investment (% of GDP)						0.0001***		
						(0.000)		
Digitalization index							0.0007**	
							(0.000)	
State fragility index								-0.0017
								(0.001)
Constant	0.2463***	0.2023***	0.1924***	0.2121***	0.1888***	0.1256***	0.2415***	0.2510***
	(0.049)	(0.049)	(0.055)	(0.048)	(0.058)	(0.040)	(0.048)	(0.053)
Observations	2,160	2,014	2,071	1,992	1,724	1,806	2,160	2,040
Number of countries	150	139	143	137	118	134	150	141
R-sq	0.8742	0.8836	0.8803	0.8916	0.9247	0.9007	0.8732	0.8763

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

23.   The size of the informal sector is insignificant once other factors are accounted for, in contrast with the conventional view that informality undermines economic and export diversification. Sub-Saharan African countries tend to present a large informal sector, ranging from 20 per cent to as high as 65 percent of the economy (Medina, Jonelis and Cangul 2017). The large informal sector presents many challenges that can reduce the production and export capacity of a country. First, the sector is characterized by low productivity, in part because it tends to attract relatively low-skill workers. Second, informal activities lack regulation and formal contracts, thus

exposing employment and general activities in this sector to unpredictable shocks. Third, the informal economy is often characterized by small or undefined workplaces, unsafe and unhealthy working conditions, low or irregular incomes, and lack of access to information, markets, finance, training and technology. The products and services produced by the informal sector is of low quality, thus undermining the opportunities to export to international markets. The insignificance of the informal sector could be driven by its major opportunities given that it could serve as a fertile ground for entrepreneurship and business start-up and provides large employment for people.

D.   Policy Implications

24.   To diversify its economy and exports, Niger needs to embark on reforms and policies aimed at tackling its structural bottlenecks and accelerating structural transformation. There are multiple paths to successful diversification, which depends on the mix, sequencing, and timing of investments, policy reforms and institution building, and on their consistency with the underlying assets and related comparative advantages of the country. The empirical analysis provides some evidence of potential policies and reforms necessary to diversify the export basket.

25.   Niger urgently needs to upgrade the human capital of its workforce, as it consistently falls short in measures of education and health outcomes. Without a concerted effort to fill these gaps as quickly as possible, human capital will remain a major constraint to structural transformation and export diversification, as the labor force will lack the basic skills required to support the development of high value-added industries. The ongoing push for school infrastructure building, the recruitment of permanent teachers and policies to promote girls' education are promising avenues in this regard. Targeted and better spending on education and health will be paramount and also help narrow social inequalities and bring the country to at least regional standards. The results could take time to materialize, though, but the costs of not acting now is higher.

26.   Investing in infrastructure should also be a priority. Being a landlocked country, Niger faces significant specific constraints imposed by geography and the promotion of infrastructure aiming at facilitating trade. Spending on transportation and transit should be a priority. To achieve efficient and integrated mobility of goods and people between Niger and its neighboring countries, there is a need to reinforce the connections within existing transportation networks and corridors, create new ones, and harmonize border procedures. The envisaged construction and rehabilitation of the road network with Benin under the Millennium Challenge Corporation and ongoing rehabilitation of the trans-Saharan corridor Lagos-Alger via Zinder and Agadez are welcome. Beyond road infrastructure, investing in electricity and ICT infrastructure will lower electricity and communications costs for firms, support their competitiveness and improve resilience and reliability of supply. Enhancing competition in these sectors are urgently needed.

27.   Government actions through well designed effective policy reforms and regulatory system that support a more diversified economy are particularly needed. Regulatory reforms and institutional arrangements to reduce barriers to diversification and in addressing market failures that limit the movement of resources to new activities should be promoted. In Niger, these reforms could include effective bankruptcy regimes that facilitate exit and encourage risk-taking and the

lifting of investment restrictions in some sectors (for instance, telecommunications). Moreover, given the central role of economic governance in creating a fair and conducive business climate, in which competition can flourish and resources are channeled into productive uses, reforms to strengthen governance should be accelerated. Actions to combat corruption will be needed to facilitate the creation and development of businesses and products and accelerate export diversification.

28.   Further improving the business environment will help attract private investment and accelerate export diversification. Important progress on upgrading the business climate has been made in Niger, but significant room for improvement remains. Clear, transparent, and predictable business regulations that provide a level playing field among investors (small and large, foreign, and domestic) are essential for economic diversification. Business regulations governing the credit market, the labor market, quality standards, the procedures and licenses required to start a business, contract enforcement and insolvency and making it easier to trade across borders could encourage investment in new activities and support export diversification. A transparent and non-discriminatory regulatory environment, including appropriate investor protection laws, can promote investment in riskier activities that have potentially long-term payoffs.

29.   The African Continental Free Trade Area (AfCFTA) can be an effective mechanism to increase new market opportunities for exporting firms of Niger. The expected reduction in tariffs and non-tariffs barriers from the AfCFTA will decrease trade costs but should be accompanied by national measures to spur diversification. These measures could include enhancing productive capacity, supporting the medium and small companies to be competitive and participate in the regional and global value chains, improving access to financing, and supporting innovation and product development.

30.   Promoting digitalization of processes will reduce cost of doing businesses and boost export diversification. Access to ICTs remains very low in Niger, but many opportunities and significant assets exist to strengthen ongoing efforts to improve connectivity. Among existing initiatives, The Niger 2.0 Smart Villages Project stands out. It aims to promote a promising approach to initiating digital transformation in rural and remote parts of the country. Developing digital communications systems by expanding fiber-optic broadband cabling and reducing the cost of access will lead to increased trade competitiveness and enhanced international integration.

31.   Promoting peace and stability as well as addressing the sources of fragility are essential components of a diversification strategy in Niger. Political stability provides conditions for policy reforms and stable macroeconomic environment, necessary to attract investment. Niger is affected by terror attacks in recent years, but the fair elections and democratic transition in 2021 proves the strength and the maturity of the institutional framework of the country and should serve as a foundation on which to strengthen peace and stability in the country. The recent initiatives, including the reinforcement of the "Chef de file de l'opposition" position, a first since the introduction of this institution by the 2010 Constitution, and the resumption of dialogue under the National Council for Political Dialogue (CNDP), are welcome.

32.   While not covered in the analytical study, vertical policies, geared towards specific sectors, can also be useful, provided they are targeted, transparent and minimize budgetary costs. Such policies could be needed to encourage the development of specific products and regions. For instance, envisaged initiative includes the upgrade of the industrial zone in Niamey and the creation of agro-business poles in all regions of Niger.

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Annex I. List of Countries

Country Name	Country Name	Country Name
Albania	France	New Zealand
Algeria	Gabon	Nicaragua
Angola	Gambia, The	Niger
Argentina	Georgia	Nigeria
Armenia	Germany	North Macedonia
Australia	Ghana	Norway
Austria	Greece	Oman
Azerbaijan	Guatemala	Pakistan
Bahamas, The	Guinea	Panama
Bahrain	Guinea-Bissau	Paraguay
Bangladesh	Hungary	Peru
Barbados	Iceland	Philippines
Belarus	India	Poland
Belgium	Indonesia	Portugal
Belize	Iran, Islamic Rep.	Qatar
Benin	Ireland	Russian Federation
Bhutan	Israel	Rwanda
Bolivia	Italy	Saudi Arabia
Bosnia and Herzegovina	Jamaica	Senegal
Botswana	Japan	Sierra Leone
Brazil	Jordan	Singapore
Brunei Darussalam	Kazakhstan	Slovak Republic
Bulgaria	Kenya	Slovenia
Burkina Faso	Korea, Rep.	South Africa
Burundi	Kuwait	Spain
Cabo Verde	Kyrgyz Republic	Sri Lanka
Cambodia	Lao PDR	St. Lucia
Cameroon	Latvia	Vincent and the Grenadine
Canada	Lebanon	Sudan
Central African Republic	Lesotho	Suriname
Chad	Liberia	Sweden
Chile	Lithuania	Switzerland
China	Luxembourg	Syrian Arab Republic
Colombia	Madagascar	Tajikistan
Congo, Rep.	Malawi	Tanzania
Costa Rica	Malaysia	Thailand
Cote d'Ivoire	Maldives	Togo
Croatia	Mali	Trinidad and Tobago
Cyprus	Malta	Tunisia
Czech Republic	Mauritania	Turkiye
Denmark	Mauritius	Uganda
Dominican Republic	Mexico	Ukraine
Ecuador	Moldova	United Arab Emirates
Egypt, Arab Rep.	Mongolia	United Kingdom
El Salvador	Morocco	United States
Equatorial Guinea	Mozambique	Uruguay
Estonia	Myanmar	Venezuela, RB
Eswatini	Namibia	Vietnam
Ethiopia	Nepal	Yemen, Rep.
Fiji	Netherlands	Zambia
Finland		

Annex II. Data Sources

Variable	Sources
Export diversification index	International Monetary Fund (IMF)
Export quality index	International Monetary Fund (IMF)
Natural resources rents (% of GDP)	World Bank's World Development Indicators (WDI)
Informal sector size (% of GDP)	World Bank's Informal Economy Database
Financial development index	International Monetary Fund (IMF)
Quality of the regulatory system	World Bank's Worldwide Governance Indicators
Trade liberalization	Gygli, S., Haelg, F., Potrafke, N. and Sturm, J-E. 2019. The KOF Globalisation Index – Revisited, *Review of International Organizations*, 14(3), 543-574
Control of corruption	World Bank's Worldwide Governance Indicators
Human capital index	World Bank's Human Capital Project
Quality of trade- and transport-related infrastructure	World Economic Forum's Global Competitiveness Report
Quality of ICT and electricity infrastructure	World Economic Forum's Global Competitiveness Report
Investment profile	International Country Risk Guide
Global competitiveness index	World Economic Forum's Global Competitiveness Report
FDI (% of GDP)	World Bank's World Development Indicators (WDI)
Domestic private investment (% of GDP)	World Bank's World Development Indicators (WDI)
Digitalization index	Gygli, S., Haelg, F., Potrafke, N. and Sturm, J-E. 2019. The KOF Globalisation Index – Revisited, *Review of International Organizations*, 14(3), 543-574
State fragility index	Polity IV Project

Annex III. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Export diversification index	2,230	0.5	0.2	0.0	1.0
Export quality index	2,185	0.8	0.2	0.2	1.1
Natural resources rents (% of GDP)	2,229	7.7	11.1	0.0	62.0
Informal sector size (% of GDP)	2,230	31.0	12.0	8.1	66.4
Financial development index	2,230	0.3	0.2	0.0	1.0
Quality of the regulatory system	1,786	52.7	27.1	0.0	100.0
Trade liberalization	2,211	55.2	23.9	1.6	97.9
Control of corruption	1,786	50.2	28.9	0.5	100.0
Human capital index	2,084	0.6	0.1	0.3	0.9
Quality of trade- and transport-related infrastructure	2,135	2.8	0.6	1.8	4.3
Quality of ICT and electricity infrastructure	2,058	3.9	1.2	1.8	6.4
Investment profile	1,837	8.7	2.1	0.0	12.0
Global competitiveness index	2,058	4.2	0.7	2.9	5.7
FDI (% of GDP)	2,225	6.0	19.6	-57.5	449.1
Domestic private investment (% of GDP)	2,028	23.1	7.2	-2.4	69.7
Digitalization index	2,230	63.1	20.3	3.4	98.6
State fragility index	2,091	8.4	6.3	0.0	24.0