INTERNATIONAL MONETARY FUND

IMF Country Report No. 26/134

GEORGIA

SELECTED ISSUES

June 2026

This paper on Georgia was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on May 19, 2026.

Copies of this report are available to the public from

International Monetary Fund • Publication Services
PO Box 92780 • Washington, D.C. 20090
Telephone: (202) 623-7430 • Fax: (202) 623-7201
E-mail: publications@imf.org Web: http://www.imf.org

International Monetary Fund
Washington, D.C.

INTERNATIONAL MONETARY FUND

GEORGIA

SELECTED ISSUES

May 19, 2026

Approved By
Middle East and Central Asia Department

Prepared By Elif Ture (MCD), Jean-Marc Atsebi (FAD), Will Abel (MCD), and Mehmet Cangul (SPR)

CONTENTS

LABOR MARKET IMPLICATIONS OF SKILL MISMATCHES AND NON-LABOR INCOME IN GEORGIA ____ **2**

A. Introduction ____ 2

B. The Size and Nature of Skill Mismatches ____ 3

C. The Impact of Remittances and Government Transfers on Labor Market Outcomes ____ 6

D. Conclusion and Policy Options ____ 11

FIGURES

1. Selected Labor Market Indicators Compared to Peers ____ 13
2. Selected Labor Market Indicators in Georgia ____ 14
3. Skill Mismatches in the Georgian Labor Market ____ 15
4. Impact of Remittances and Government Transfers on Labor Market Outcomes ____ 16
5. Propensity Scores and Covariate Balancing ____ 18

References ____ 19

RESERVE ADEQUACY IN GEORGIA: HOW MUCH IS ENOUGH? ____ **21**

A. Introduction ____ 21

B. Analytical Framework: Baseline and Extensions ____ 22

C. Conclusions and Policy Options ____ 26

References ____ 27

ANNEX

I. Technical Details ____ 29

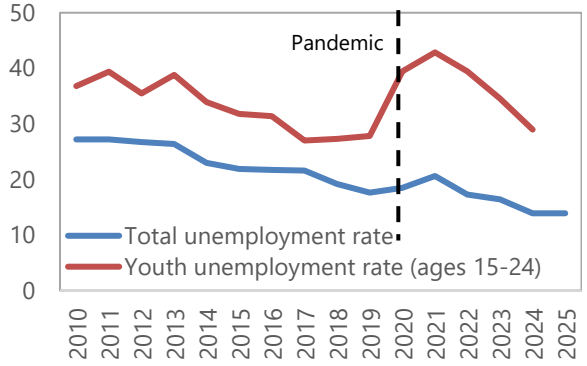
LABOR MARKET IMPLICATIONS OF SKILL MISMATCHES AND NON-LABOR INCOME IN GEORGIA[1]

Unemployment remains structurally high in Georgia, partly driven by high skill mismatches and weak work incentives amid low wages, with many households relying on remittances and government transfers as key income sources. This paper finds that over-education remains widespread in Georgia amid limited availability of productive jobs, alongside shortages in technical and job-relevant skills reflecting weak links between education and labor demand. At the same time, remittances and social transfers are estimated to lower the aggregate employment rate by about 2¼ percentage points. Addressing these constraints requires coordinated efforts in education reform, sectoral upgrading, employer-led training, and more effective public employment services and social assistance benefits.

A. Introduction

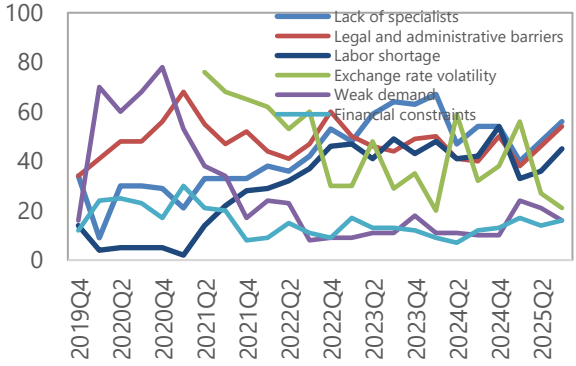
1. Georgia faces persistent labor market challenges, notably high unemployment, particularly among youth, and mounting reports of skill shortages by firms (Text Figures 1-2). Unemployment has fallen to a historic low, but it remains above most peers, particularly among young people (Figure 1a). While labor force participation is broadly in line with peers (Figure 1b), youth inactivity is notably high, with a larger share of young people neither studying nor working compared to most peers (Figure 1c). At the same time, firms increasingly report skill and labor shortages among top business constraints, yet wages lag peers (Figure 1d), with many households relying on income support from remittances (Figure 1e) and government transfers (Figure 1f).

Text Figure 1. Unemployment Rate
(In percent of labor force)



Source: GEOSTAT.

Text Figure 2. Factors Hindering Business Activity



Source: BAG Business Climate Surveys.

[1] Prepared by Jean-Marc Atsebi (FAD) and Elif Ture (MCD).

2. This paper examines how skill mismatches and sizeable non-labor income from remittances and government transfers affect labor market outcomes in Georgia. It finds widespread over-education and under-skilling, reflecting a structural oversupply of general and tertiary education relative to job-relevant and technical skills. In 2024, 27 percent of prime-age workers and 36 percent of youth were overeducated for their jobs, with 40 percent of tertiary educated workers in mid-to-low-skilled roles, whereas under-education was concentrated in higher-skill sectors such as ICT, finance, and managerial and professional roles. Field-of-study mismatches were also sizeable, with only about a third of workers employed in jobs aligned with their training. These patterns point to weak links between education and labor market demand and limited absorption capacity in high-productivity sectors. At the same time, low wages combined with sizable remittances and social transfers dampen labor supply incentives, particularly for women. Using a doubly robust Augmented Inverse Probability Weighting (AIPW) approach, staff estimate that remittances and government transfers reduce household employment rates by about 17 and 8 percentage points, respectively—with effects concentrated in hired and secondary employment—implying a drag on aggregate employment of roughly 1 percentage point from remittances and about 1¼ percentage points from transfers.

3. The rest of the paper is organized in three sections: Section B assesses the scale and nature of skill mismatches in Georgia, Section C analyzes the impact of remittances and government transfers on work incentives, and Section D concludes with a summary of results and policy options.

B. The Size and Nature of Skill Mismatches

4. A large body of analytical work by the World Bank, the EU, and academia consistently identifies Georgia as a high-mismatch economy.[2] Evidence from labor force surveys (2011-19) shows that Georgia has one of the highest rates of over-education and over-qualification among transition and developing economies, pointing to structural rather than cyclical imbalances. At the same time, widespread overeducation coexists with skill gaps. Despite an oversupply of general qualifications, employers report persistent shortages of job-specific, technical skills. The literature attributes these patterns to the rapid expansion of tertiary education amid slow structural transformation with limited development of modern, high-productivity sectors to absorb skilled labor, as well as misalignment of curricula with labor market needs, including due to weak vocational education and training (VET) systems and job-matching institutions.

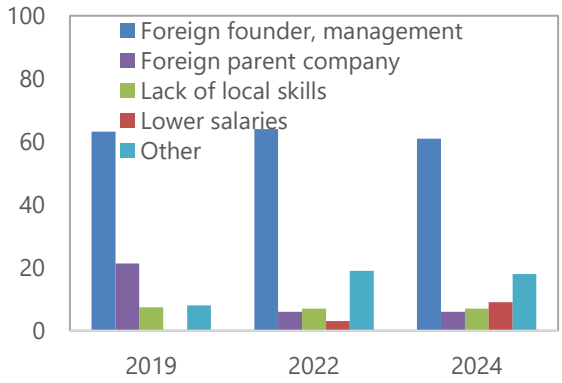
5. This paper extends the analysis to the post-pandemic period to assess whether skill mismatches persist and identify individuals and sectors most affected. In the absence of direct skill measures, employees' education, profession, and occupation are used as proxies for skills taught, possessed, and required. Mismatch is assessed along two dimensions: vertical (qualification) mismatch, measuring over- and under-education relative to occupations, and horizontal (field-of-study) mismatch, capturing misalignment between training/education fields (profession)

[2] See Rutkowski 2013; Kupetz 2016; Handel and others 2016; World Bank 2013, 2018, and 2025; and European Training Foundation 2019 and 2022.

and current jobs.[3] The analysis draws primarily on Georgian labor force survey microdata for 2019-24, which report international standard classifications for education (ISCED), occupation/profession (ISCO-08), and economic activity/sectors (NACE). These data are complemented by aggregate labor-market indicators from GEOSTAT and firm-level evidence from the Ministry of Economy and Sustainable Development's (MoESD) Surveys of Business Demand for Skills.

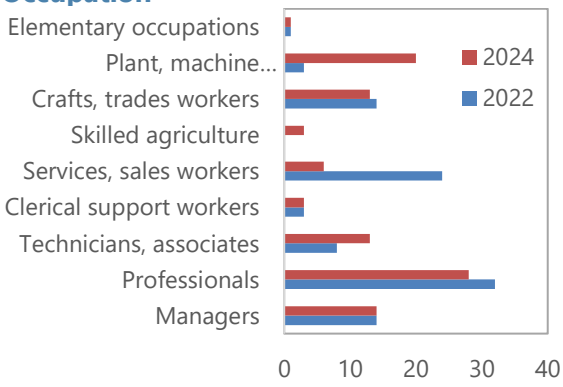
6. Descriptive evidence already points to substantial mismatches. Lower educational attainment is associated with weaker labor force participation (Figure 2a) and higher unemployment (Figure 2b), while employment has shifted away from agriculture toward trade and construction (Figure 2c) and elementary occupations (Figure 2d), suggesting increasing absorption of educated workers into lower skill jobs. At the same time, vacancies have risen in high skill sectors like ICT and finance (Figure 2e), while declining in mid-skill jobs in trade, sales, and construction (Figure 2f). Firm-level data show that about 8 percent of surveyed businesses employ foreign workers (around 2 percent of total employment), partly reflecting shortages of local skills especially in professional roles, with an increasing share of businesses reporting lower salaries as the main reason for employing foreigners (Text Figure 3). Foreign workers are concentrated in ICT, construction, and managerial and professional roles (Text Figure 4), pointing to under-skilling in key sectors.

Text Figure 3. Reasons for Employing Foreigners



Source: MOESD Surveys of Business Demand on Skills.

Text Figure 4. Lack of Local Skills by Occupation



Source: MOESD Surveys of Business Demand on Skills.

7. Using the modal (empirical) method to assess vertical (qualification) mismatch, staff find that overeducation is widespread. This method draws on the distribution of the workers' education levels within each occupation and defines the education level required for a job as the mode (most common) education level for this occupation. Mismatch is identified when the individual's education level deviates from the mode by more than one standard deviation. In 2024, about 27 percent of prime-age workers and 36 percent of youth were overeducated for their jobs (Figure 3a), indicating significant underutilization of human capital. Overeducation was most prevalent in general and middle-skill sectors and occupations, such as trade and tourism, and

[3] See Flisi and others (2017) for a review of different methodologies used in the literature to measure skill mismatches.

services and sales workers (Figures 3b and 3c). Undereducation was also significant, particularly among the elderly (Figure 3a), which points to experience substituting for formal education given lower unemployment rates in this group. Under-education was concentrated in higher skill-sectors and occupations, including ICT, finance, and science, as well as managerial and professional roles (Figures 3b and 3c).

8. Applying the job analysis (normative) method to assess vertical mismatch yields similar conclusions. This method maps occupational (ISCO) groups to required skill levels (low, medium, high) and education (ISCED) ranges using ILO standards (Text Figure 5). Overeducation measures the share of tertiary educated (high-skill) workers employed in mid-to-low skill jobs, and undereducation is identified as the share of secondary educated (mid-skill) workers employed in high skill jobs. This method shows that around 40 percent of tertiary educated prime-age workers are employed in mid-to-low-skill jobs, while a growing share of vocational educated workers (30 percent in 2024) are employed in higher-skill jobs (Figure 3d), consistent with employers prioritizing job-relevant skills over general education.

Text Figure 5. Mapping of Occupational Groups and Education Ranges by ILO

ISCO Occupational Group	ISCO Skill Levels	ISCED Education Ranges
1 Managers	High (3)	Tertiary
2 Professionals		
3 Technicians, Associates		
4 Clerical Support Workers	Medium (2)	Secondary General vs Vocational
5 Services, Sales Workers		
6 Skilled Agriculture, Fishing		
7 Crafts, Trade Workers		
8 Plant, Machine Operators		
9 Elementary Occupations	Low (1)	Basic general and below

Source: ILO.

9. Horizontal (field of study) mismatch is also pronounced. A worker is considered mismatched if their current occupation differs from the occupation for which they received formal training. A limitation is that only half of employees report their field of training (mostly professionals or technicians). With this caveat, the results suggest that about two thirds of prime-age workers are employed outside their field of training (Figure 3e). Mismatch rates are particularly high among men and the lower/vocational educated, pointing to weak links between vocational education and labor market absorption. In contrast, mismatch is lower among women and youth, pointing to moderate transition frictions from school and childcare. Elevated mismatch between trained profession and current occupation may reflect inefficient post-secondary specialization decisions and weak career guidance, prioritizing general skills or experience over field-specific skills, or workers accepting any available job regardless of training amid limited options. As expected, mismatch is lower in highly professionalized sectors like education, health, science, and ICT (Figure 3f), reflecting clear certification requirements and persistent skill shortages in these sectors.

10. Mismatches have remained persistent, with little change since 2019 (Text Figures 6-7). A notable shift is among older workers, who have increasingly become undereducated relative to their occupations, likely reflecting experience substituting lower education and legacy Soviet-era education patterns that previously resulted in overeducation in this age group. At the same time, workers with post-secondary vocational education exhibit declining overeducation and rising undereducation, consistent with their growing presence in jobs typically requiring bachelor-level

qualifications. In contrast, doctoral degrees appear increasingly oversupplied. Horizontal (field-of-study) mismatch has declined among post-secondary vocational and bachelor-educated workers, but has risen among pre-secondary vocational workers and youth, possibly reflecting initial job acceptance followed by job switching as experience accumulates.

Text Figure 6. Vertical (Qualification) Mismatch

	Overeducation			Undereducation		
	2019	2022	2024	2019	2022	2024
Prime (25-54)	27%	27%	27%	6%	8%	8%
Youth (15-24)	35%	40%	36%	16%	18%	19%
Elderly (55+)	24%	25%	22%	16%	18%	21%
Women	27%	25%	26%	7%	10%	10%
Men	28%	28%	28%	6%	7%	6%
Urban	28%	29%	29%	9%	9%	9%
Rural	27%	24%	25%	4%	6%	5%
Secondary	0%	0%	0%	7%	9%	9%
Vocational I	1%	0%	1%	7%	17%	16%
Vocational II	7%	17%	25%	8%	16%	16%
Vocational III	80%	71%	70%	7%	17%	25%
Bachelor	37%	36%	40%	13%	9%	13%
Master	38%	37%	40%	0%	2%	1%
Doctor	29%	34%	91%	0%	0%	1%

Source: Georgian labor force surveys and IMF staff calculations.

Text Figure 7. Horizontal (Field of Study) Mismatch

	2019	2022	2024
Prime (25-54)	72%	67%	67%
Youth (15-24)	64%	65%	69%
Elderly (55+)	79%	68%	70%
Women	62%	57%	57%
Men	82%	78%	78%
Urban	68%	66%	65%
Rural	79%	70%	70%
Vocational I	71%	82%	86%
Vocational II	88%	73%	75%
Vocational III	80%	74%	69%
Bachelor	75%	73%	71%
Master	64%	60%	61%
Doctor	36%	11%	36%

Source: Georgian labor force surveys and IMF staff calculations.

C. The Impact of Remittances and Government Transfers on Labor Market Outcomes

Literature Review

11. The impact of non-labor income (remittances and government transfers) on labor participation and reservation wages is theoretically ambiguous given multiple offsetting channels. First, via a standard income–leisure mechanism, additional income raises reservation wages and reduces labor supply (Borjas, 2020; World Bank, 2015). Second, by easing budget constraints, these flows support human capital accumulation—especially schooling among youth—leading to lower labor force participation in the short run but potentially higher productivity and earnings over time (Acosta, 2011; Alcaraz et al., 2012). Third, liquidity and productivity effects operate through improved access to credit and better health, enabling self-employment and small business creation, which can increase labor supply and earnings, particularly in constrained settings (Woodruff and Zenteno, 2007; Yang, 2008; Dasgupta and Ray, 1986). Fourth, as informal insurance, remittances and transfers relax risk constraints and finance job search, allowing workers to transition toward higher-return but riskier activities (e.g., self-employment), implying possible short-term declines in participation but improved employment quality and wages over time (Kraay and McKenzie, 2014). Finally, at the household level, these inflows can generate labor reallocation and demonstration effects—where some members withdraw while others increase participation—with a net effect that may potentially raise overall household labor supply (Mendola and Carletto, 2012; Posso, 2012).

Key Questions, Data, and Stylized Facts

12. The impact of non-labor income on labor market outcomes is therefore an empirical, context-specific question. In Georgia—where remittances and government transfers are sizable—competing forces are at play: income effects may dampen participation and increase reservation wages, while liquidity and insurance channels can support job search, self-employment, and transitions into more productive activities. The net effect hinges on which force dominates. Against this backdrop, key questions are whether these income sources weaken work incentives, whether they are large enough to reshape household income rankings, and whether—after accounting for selection and reverse causality—recipient households exhibit lower employment rates. Do these effects vary across groups, notably female-headed and urban households, and across job types, with hired and secondary employment more affected than self-employment?

13. To answer these questions, this analysis draws on the Household Income and Expenditure Survey (HIES) over the period 2017-2024. It is a nationally representative household survey that provides detailed information on income sources, labor market outcomes, and living conditions. The HIES collects data on household demographics, employment status, earnings, remittances, and government transfers, as well as assets, housing conditions, and access to services. Its rich micro-level information allows for a comprehensive assessment of both labor supply behavior and non-labor income sources, while its national coverage ensures representativeness across regions and population groups.

14. In Georgia, remittances and government transfers provide crucial income support. Remittance inflows are sizable (about 12 percent of GDP in 2024), yet only 6 percent of surveyed households receive them. By contrast, government transfers (excluding pensions) are much more widespread: 34 percent of households without pensioners receive them, equivalent to about 16 percent of all households (Figure 4a).[4] For recipient households, these transfers are substantial and often exceed labor income (Figure 4b). Both income sources are progressive: the share of recipient households declines with income excluding remittances and government transfers, indicating that poorer households are more likely to benefit (Figures 4c and 4d). However, a non-negligible share of higher-income households also receives these incomes. The magnitudes are large enough to reshape the income distribution, in some cases moving poorer households up the income ladder. Once these sources are included in income, remittances become more prevalent among higher-income quartiles (Figure 4c). In contrast, government transfers remain more concentrated among lower-income groups, albeit less sharply, underscoring their redistributive role (Figure 4d).

15. Household employment rates are systematically lower among recipients of remittances and government transfers compared to non-recipients, with sizable gaps across all groups (Figures 4e and 4f). The difference is particularly pronounced at higher levels of remittances and government transfers, where employment rates decline more sharply among

[4] These statistics are unweighted and based on the surveyed households. Over the period 2017-2024, remittances remain sizable and relatively stable (around 6–7 percent of GDP), while transfers account for a much larger share (around 30–40 percent), highlighting their dominant role in household income support.

recipient households (Figures 4e and 4f). This pattern suggests a negative association between non-labor income and labor supply, consistent with income effects that raise reservation wages and reduce the need to work. The monotonic decline in employment as the amount of remittances or transfers increases further reinforces this interpretation, indicating that larger inflows are associated with weaker labor market outcomes (Figures 4g and 4h).

Empirical Strategy

16. Identifying the labor-supply effects of remittances and government transfers requires careful treatment of endogeneity. Recipient households are not random: they differ systematically in both observed and unobserved characteristics—such as ability, preferences, and networks—that also shape labor supply and give rise to selection bias. At the same time, reverse causality is a concern, as labor market outcomes can influence the likelihood and magnitude of receiving transfers or remittances. As a result, simple correlations may be misleading, including in sign. Credible inference therefore hinges on a robust identification strategy that jointly addresses selection and reverse causality.

17. To address endogeneity, staff use an Augmented Inverse Probability Weighting (AIPW) estimator, which combines propensity score weighting with outcome regressions to identify causal effects.

- In the treatment model (first stage), the probability of receiving remittances or government transfers ($\widehat{p_{i,t}}$) is estimated using a Covariate Balancing Propensity Score (CBPS) approach. The specification includes a rich set of covariables, including household income and subjective economic status, household characteristics, head attributes, and geographical variables (urban and regional dummies).[5] This model ensures that observable characteristics are well balanced between recipients and non-recipients.

- In the outcome models (second stage), potential outcomes are estimated separately for treated ($\mathbb{E}[y_{i,t}^{k}|\widehat{Treat_{i,t}} = 1; X_{i,t}]$) and control ($\mathbb{E}[y_{i,t}^{k}|\widehat{Treat_{i,t}} = 0; X_{i,t}]$) groups as a function of: household income excluding remittances and government transfers ($ndincome_{i,t}$), subjective economic status ($subeconstatus$), household characteristics ($HHchar_{i,t}$), head attributes ($HHheadchar_{i,t}$), and location-specific effects ($urban_{i,t}$). The outcome models are specified as follows:

[5] The full list of variables used in the treatment model are (i) household income and subjective economic status: total household income excluding remittances or government transfers, subjective economic status categories (good, middle, satisfactory, bad, very bad), recent financial conditions (whether the household's financial situation worsened very much or slightly over the past 12 months), and the subjective minimum income needed; (ii) household characteristics: household size, composition by age and gender (number of young children, adolescents, working-age men and women, and pension-age men and women), as well as indicators of social assistance application, digital access (internet and computer use), and housing conditions (number of rooms and whether the dwelling requires cosmetic, overall, or immediate repairs); (iii) household head characteristics: gender, age, education levels (from illiterate to university), and marital status (single, married, divorced, widowed); (iv) geographical variables: an urban dummy and regional dummies.

$$y_{i,t}^{k} = \Lambda_1^k\, ndincome_{i,t} + \Lambda_2^k\, subeconstatus_{i,t} + \Lambda_3^k\, HHchar_{i,t} + \Lambda_4^k\, HHheadchar_{i,t} + \Lambda_5^k\, urban_{i,t} + r_i^k + \varepsilon_{i,t}^k, \quad \text{for } Treat_{i,t} \in \{0,1\}$$

- Where $y_{i,t}^k$ denotes the labor market outcome of interest (e.g., household employment rate). $Treat_{i,t}$ is defined separately for remittances and government transfers, taking value 1 if the household receives the respective transfer and 0 otherwise; effects are estimated independently for each treatment. r_i^k denotes fixed effects capturing unobserved heterogeneity. The error term $\varepsilon_{i,t}^k$ captures idiosyncratic shocks.

- The AIPW estimator then combines these potential outcomes with the estimated propensity scores to estimate the average treatment effect (ATE). First, it reweights observations using the propensity score $\hat{p}_{i,t}$, so that households that are underrepresented among recipients (or non-recipients) receive more weight—this mimics a randomized comparison. Second, it uses potential outcomes to identify the counterfactual (what recipients would have experienced without transfers or government transfers, and vice versa). This "doubly robust" approach yields consistent estimates if either the treatment or outcome model is correctly specified, thereby mitigating selection bias and reverse causality. The ATE is as follows:

$$ATE_{AIPW} = \frac{1}{n}\sum_i \sum_t \left(\left[\frac{Treat_{i,t} \times y_{i,t}^k}{\widehat{p_{i,t}}} - \frac{(1 - Treat_{i,t}) \times y_{i,t}^k}{1 - \widehat{p_{i,t}}} \right] - \frac{Treat_{i,t} - \widehat{p_{i,t}}}{\widehat{p_{i,t}}\,(1 - \widehat{p_{i,t}})} \times \left[\left((1 - \widehat{p_{i,t}}) \mathbb{E}[y_{i,t}^k | \widehat{Treat_{i,t}} = 1; X_{i,t}] + \widehat{p_{i,t}} \mathbb{E}[y_{i,t}^k | \widehat{Treat_{i,t}} = 0; X_{i,t}] \right) \right] \right)$$

Propensity Scores and Balancing Checks

18. The propensity score distributions show substantial overlap in propensity scores between treated and control groups, supporting credible comparisons for both treatments. At the same time, there are clear differences in observables between treated and control groups (Figures 5a and 5b). For remittances, there is substantial overlap at low and mid-range probabilities, with treated households more concentrated in the upper tail—consistent with observable selection captured by the CBPS (Figure 5a). For government transfers, distributions are more dispersed and treated units exhibit a bimodal pattern with greater mass at higher scores, while controls cluster at lower probabilities; however, overlap in the central range remains sufficient to support credible identification (Figure 5b).

19. Remittance-receiving households differ sharply from non-recipients across multiple dimensions, but weighting using propensity scores completely eliminates these differences (Figure 5c). They have much lower non-remittance income, yet report better subjective economic status and higher perceived minimum income needs. They are larger and more labor-rich, with more children, adolescents, and working-age adults, and fewer elderly members. They are far less likely to apply for social assistance, consistent with eligibility differences or substitution with migration. They also exhibit stronger connectivity and assets (higher internet/computer use, better housing conditions). Household heads are younger and more often married. Spatially, they are concentrated

in the regions of Samtskhe-Javakheti and Imereti–Racha-Lechkhumi–Kvemo Svaneti, and underrepresented in Tbilisi and Guria. Taken together, these differences point to a multidimensional selection of households receiving remittances. After weighting, however, these gaps are eliminated, indicating that the reweighting effectively restores comparability.

20. Similarly, government transfer recipients (excluding households with pension-eligible members) differ starkly from non-recipients. These differences indicate that recipients are systematically different from non-recipients, which are addressed using CBPS (Figure 5d). The recipients have substantially lower income excluding transfers and are much more likely to report poor economic status. They are larger households with more children and adolescents and markedly more elderly members, particularly pension-age women. They are far more likely to apply for social assistance, consistent with program targeting. They also exhibit weaker assets and connectivity—lower internet and computer use, fewer rooms, and poorer housing conditions. Household heads are slightly older, less educated at higher levels, and more often widowed. Spatially, they are less in urban areas, underrepresented in Tbilisi, and more concentrated in regions such as Samegrelo–Zemo Svaneti. After weighting, however, all standardized differences are eliminated, confirming that the reweighting fully balances observable characteristics.

Results

21. Remittances and government transfers weaken labor supply outcomes, with larger effects from remittances (Figures 4i to 4l). The estimated results are economically large and statistically significant. Remittances reduce the household employment rate by about 17 percentage points, with similarly pronounced declines in hired employment (≈15 pp) and secondary job holding (≈5 pp), while self-employment is only marginally affected. Government transfers (excluding pensions) also lower labor supply, though to a lesser extent, reducing overall employment by around 8 percentage points, hired employment by about 5.5 pp, and secondary job rates by 2½ pp, with negligible effects on self-employment. These findings are consistent with the broader literature, which documents income effects that dampen wage employment and secondary jobs, while self-employment tends to be less impacted.

22. To put these results into perspective, a back-of-the-envelope estimation suggests that remittances and government transfers may reduce the national employment rate by around 2¼ percentage points. Applying the estimated employment effects to recipient shares implies that remittances (received by 6 percent of households) could lower aggregate employment by about 1 percentage point, while government transfers excluding pensions (received by 16 percent) could reduce it by roughly 1¼ percentage points.[6] While illustrative and not accounting for overlap between recipients of remittances and social transfers, this calculation highlights the potentially sizable macroeconomic relevance of non-labor income for Georgia's labor market dynamics.

[6] Government transfers (excluding pensions) are received by 34 percent of non-pension households, which represent about 46 percent of all households—equivalent to about 16 percent of households economy-wide. Share of households receiving both remittances and government transfers is low at 0.9 percent.

23. The results reveal clear heterogeneity: labor supply reductions are stronger in female-headed households, and vary across urban and rural areas (Figures 4i to 4l). For overall household employment, remittance effects are similar in urban and rural areas, while government transfers have a stronger negative impact in urban households. Female-headed households consistently experience larger reductions in employment rates for both remittances and transfers. The same pattern holds for hired employment: limited urban–rural differences for remittances, but stronger effects of transfers in urban areas, and markedly larger declines for female-headed households. For secondary jobs, effects are stronger in rural areas for both treatments, pointing to greater adjustment at the margin of labor supply, with again larger declines among female-headed households. By contrast, effects on self-employment are negligible, with only a small reduction for remittances in urban areas.

D. Conclusion and Policy Options

24. Skill mismatches in Georgia remain large and persistent. Labor force survey evidence confirms widespread over-education alongside under-skilling. A sizable share of workers, particularly youth and the tertiary educated, are employed below their qualification level, while skill shortages are most acute in higher-skill sectors such as ICT and finance, and professional occupations. Field-of-study mismatch is also pronounced, with only about one-third of prime-age workers employed in occupations aligned with their training. These patterns point to an oversupply of general/tertiary education relative to job-relevant and technical skills, compounded by weak linkages between education/training and labor market demand, and limited absorption capacity in high-productivity sectors amid slow structural transformation.

25. Remittances and government transfers provide crucial income support. Remittance inflows are sizable (about 12 percent of GDP in 2024), yet only 6 percent of surveyed households receive them, compared with 16 percent receiving government transfers (excluding pensions). For recipient households, these transfers are substantial and often exceed labor income. While they primarily benefit the poor, a notable share accrues to richer households, and the magnitudes are large enough to reshape the income distribution, in some cases making the poorest the richest.

26. Remittances and government transfers materially reduce the national employment rate by around 2¼ percentage points. Using a doubly robust Augmented Inverse Probability Weighting (AIPW) approach to address selection bias and reverse causality estimates show that at the household level, remittances have the strongest effects, reducing household employment rates by roughly 17 percentage points, while government transfers lower employment by about 8 percentage points. In all cases, the impact on employment is negative and larger for female-headed households, and concentrated among hired employees and secondary jobs, with self-employment largely unaffected.

27. These results point to two complementary priorities to support job creation:

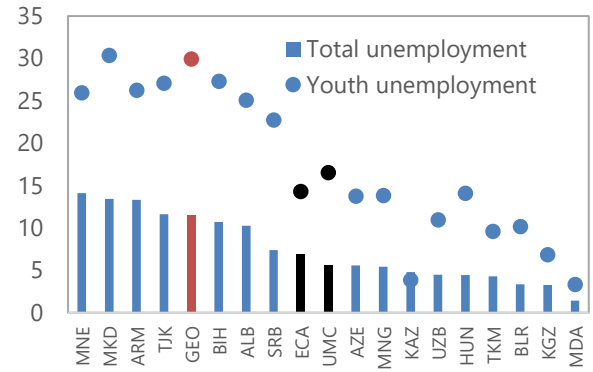
- **Reduce mismatches by raising the job-relevance of skills.** Priorities include improving teaching quality and aligning curricula with labor-market demand; strengthening vocational

education and training (VET); expanding employer-led training, apprenticeships, and internships; and upgrading job-matching institutions (public employment services, career guidance). Given evidence of shortages in higher-skill sectors, policies that support sectoral upgrading (e.g., in ICT, logistics, renewable energy) can help absorb skilled labor while easing constraints reported by firms.

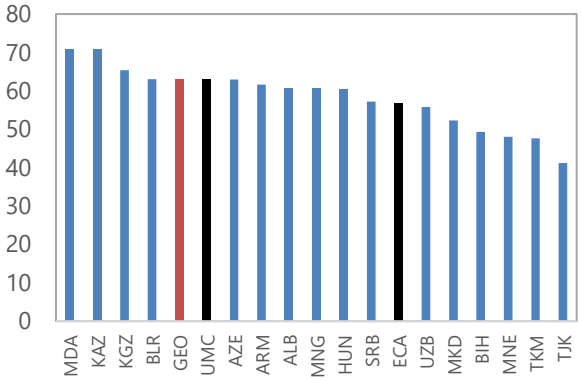
- **Protect households while strengthening work incentives.** Before expanding benefit generosity further, policymakers should assess labor-supply effects and strengthen links between social assistance and activation (training, job search, counseling). Complementary measures—especially to lift women's participation—include scaling up childcare/eldercare, expanding access to upskilling, and enabling flexible work arrangements. Policies that help channel remittances and transfers into productive investment (e.g., education, co-financed start-ups) can mitigate disincentives while supporting productivity.

Figure 1. Selected Labor Market Indicators Compared to Peers

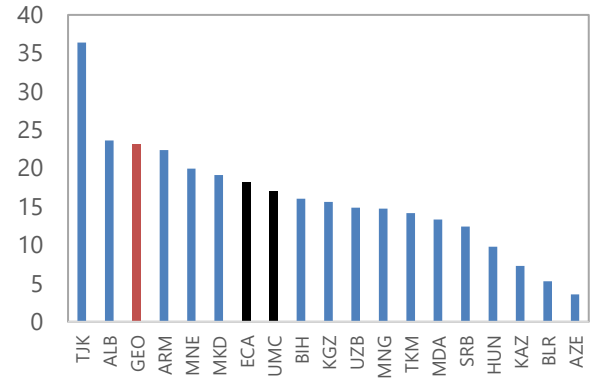
a. Unemployment Rate, 2024
(In percent of labor force)



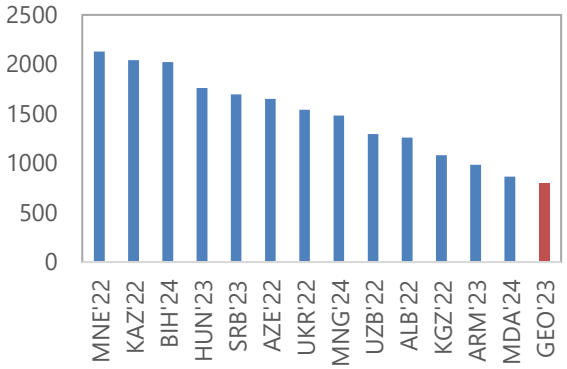
b. Labor Force Participation Rate, 2024
(In percent of population aged 15+)



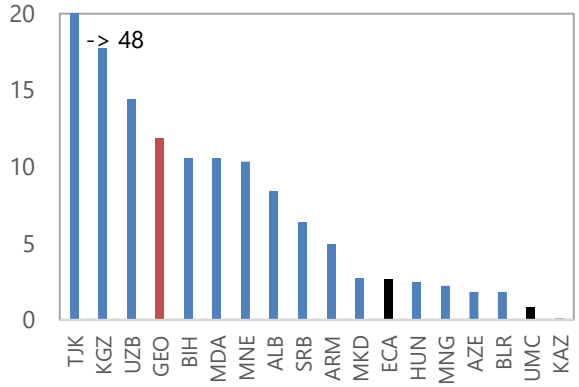
c. Youth not in Education, Employment, or Training, 2024 (In percent of population aged 15-24)



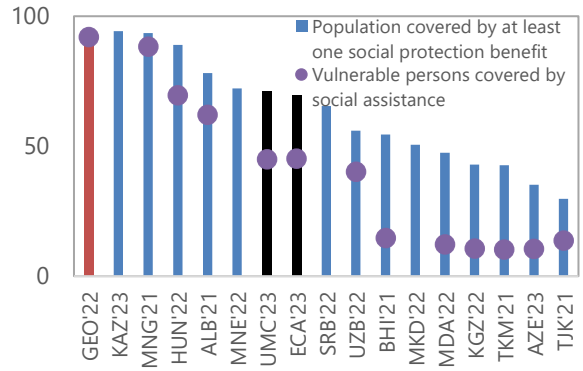
d. Average Monthly Employee Earnings, Latest
(In US dollars adjusted for purchasing power parity)



e. Personal Remittances Received, 2024
(In percent of GDP)



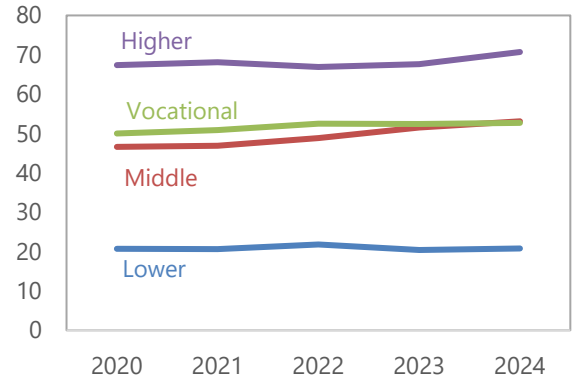
f. Coverage of Social Benefits, Latest
(In percent of population)



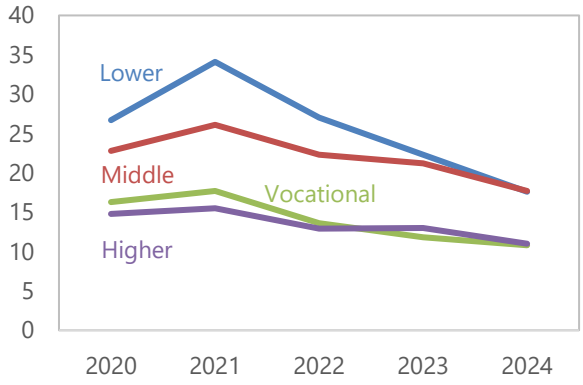
Sources: WDI (modeled ILO estimates) and ILO.
ECA: Europe and Central Asia excluding high income countries. UMC: Upper middle-income countries.

Figure 2. Selected Labor Market Indicators in Georgia

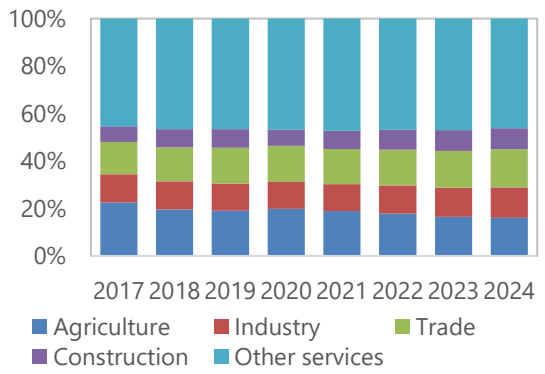
a. Labor Force Participation by Educational Attainment (In percent of working age population)



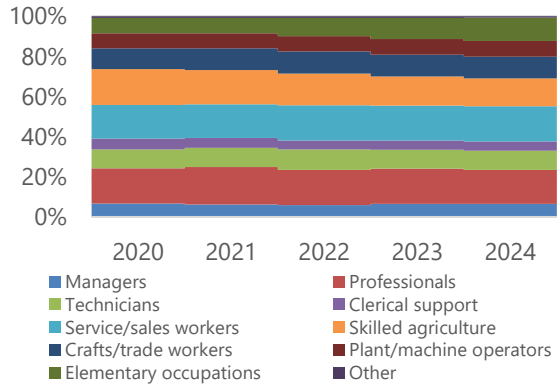
b. Unemployment by Educational Attainment (In percent of labor force)



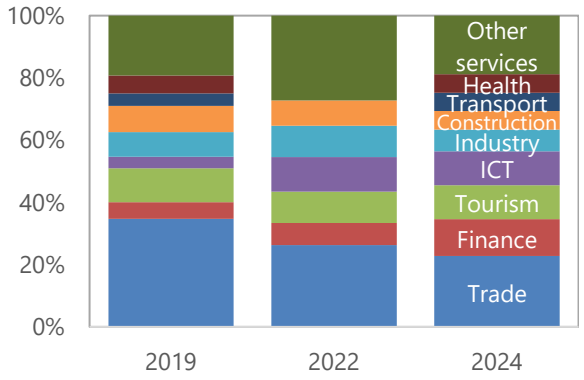
c. Distribution of Employment by Sector



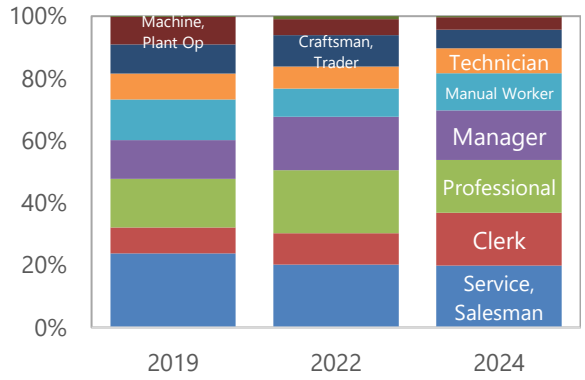
d. Distribution of Employment by Education



e. Distribution of Vacancies by Sector



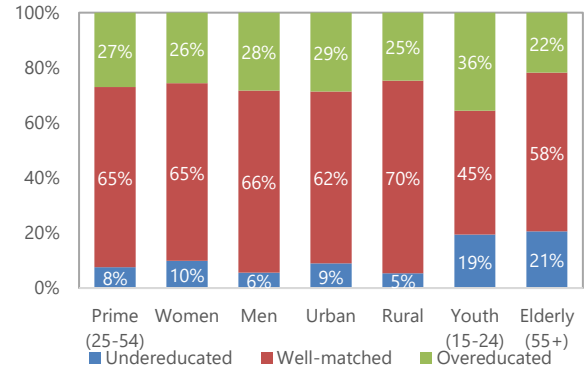
f. Distribution of Vacancies by Occupation



Sources: GEOSTAT and MoESD Surveys of Business Demand on Skills.
Educational Attainment: Lower: Primary and Lower Secondary; Middle: Upper Secondary, Higher: Tertiary

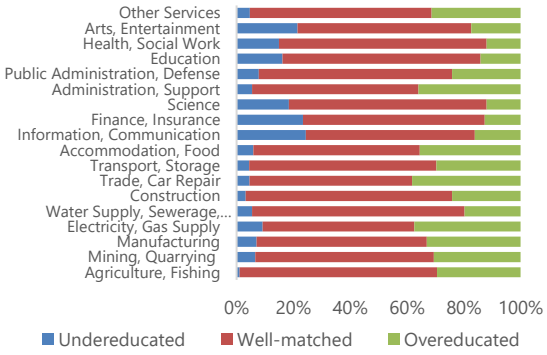
Figure 3. Skill Mismatches in the Georgian Labor Market

a. Education Mismatch by Sex, Region, Age, 2024



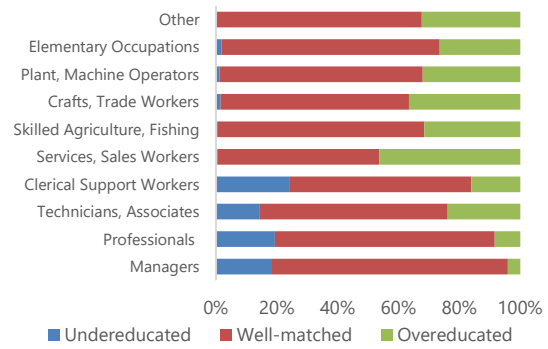
Over/Under-educated: Education above/below the modal level for each occupation by more than one standard deviation

b. Education Mismatch by Sector, 2024



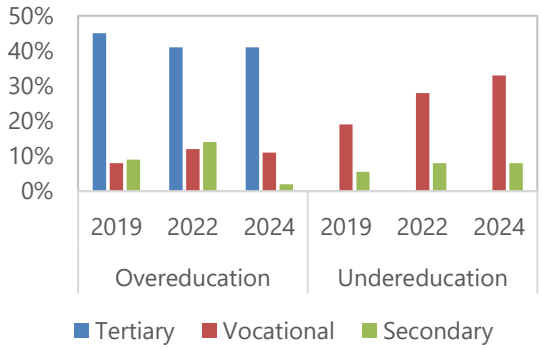
Over/Under-educated: Education above/below the modal level for each occupation by over one standard deviation

c. Education Mismatch by Occupation, 2024



Over/Under-educated: Education above/below the modal level for each occupation by more than one standard deviation

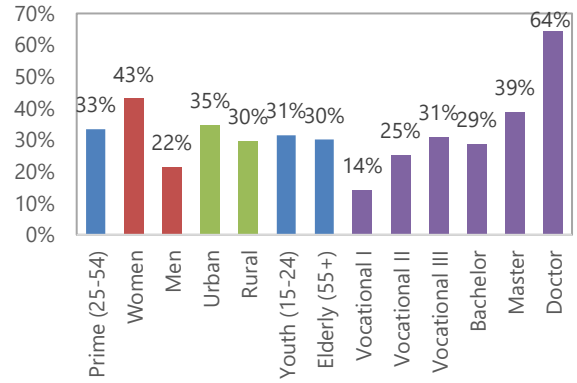
d. Skill Mismatch by Educational Attainment



Overeducation: High-educated in mid/low skill jobs

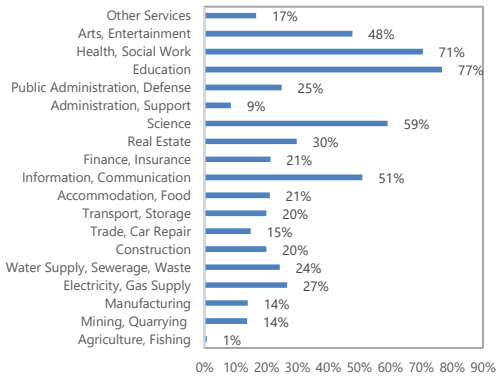
Undereducation: Mid-educated in high skill jobs

e. Field of Study Match by Sex, Region, Age, Education, 2024



A mismatch refers to trained and actual occupation being in different ISCO occupational major groups.

f. Field of Study Match by Sector, 2024

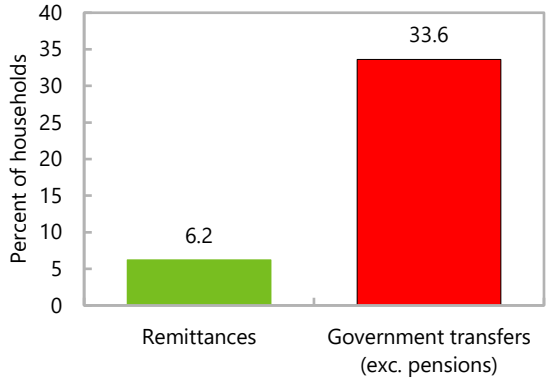


A mismatch refers to trained and actual occupation being in different ISCO occupational major groups.

Sources: Georgian Labor Force Surveys 2019-2024 and IMF staff calculations.

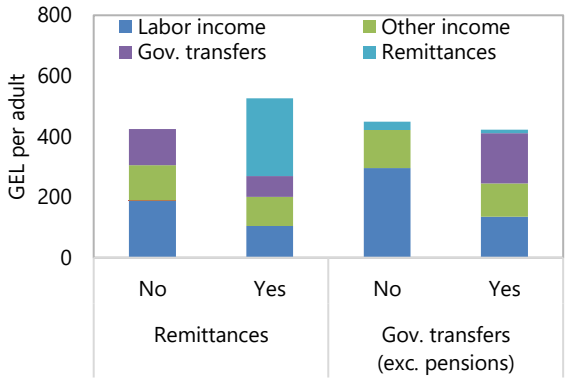
Figure 4. Impact of Remittances and Government Transfers on Labor Market Outcomes

a. Recipients of Income Transfers



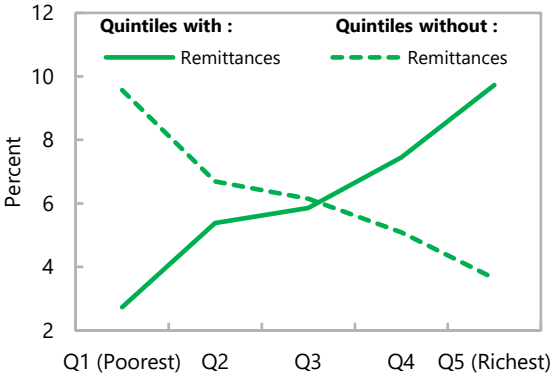
Government transfers (excluding pensions) report the share among households with no member eligible for a pension.

b. Income of Transfer Recipients vs Nonrecipients

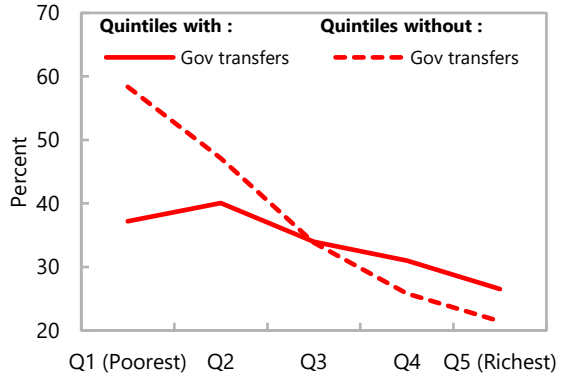


Government transfers (excluding pensions) report the share among households with no member eligible for a pension.

c. Incidence of Remittances by Income Quintile

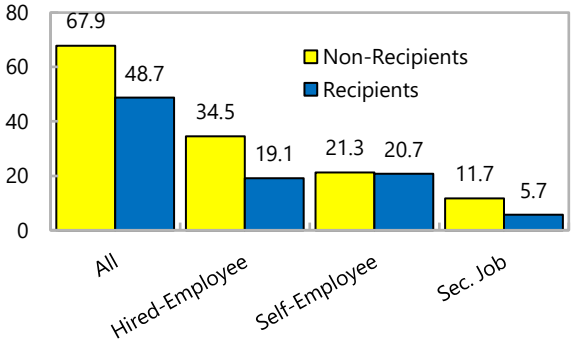


d. Incidence of Gov. Transfers by Income Quintile

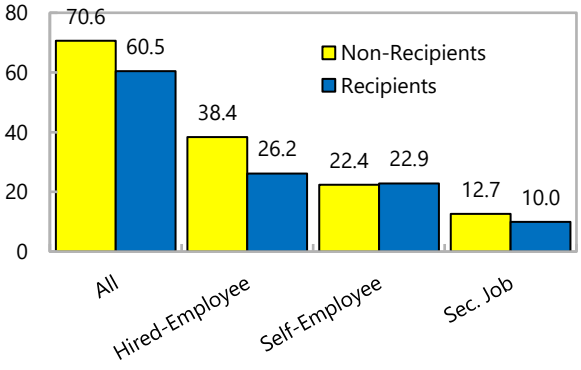


Government transfers (excluding pensions) report the share among households with no member eligible for a pension.

e. Household Employment Rate by Remittances



f. Household Employment Rate by Gov. Transfers

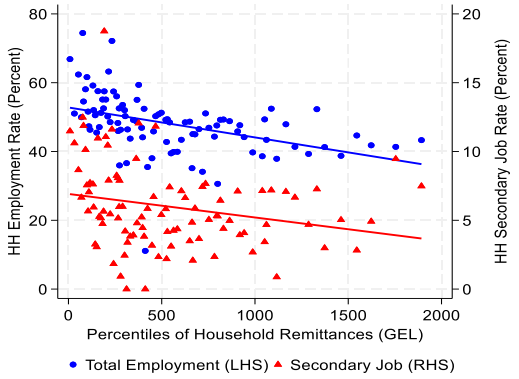


Government transfers (excluding pensions) report the share among households with no member eligible for a pension.

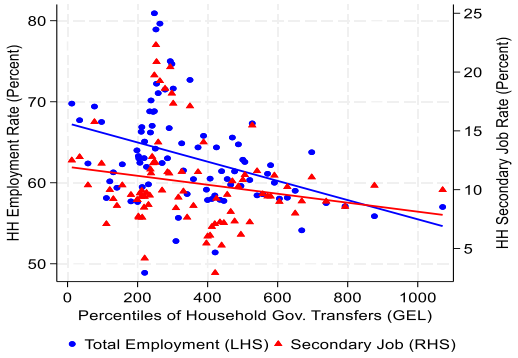
Sources: Georgian Household Income and Expenditure Surveys 2017-2024 and IMF staff calculations.

Figure 4. Impact of Remittances and Government Transfers on Labor Market Outcomes
(Concluded)

g. Household Employment Rate by Amount of Remittances

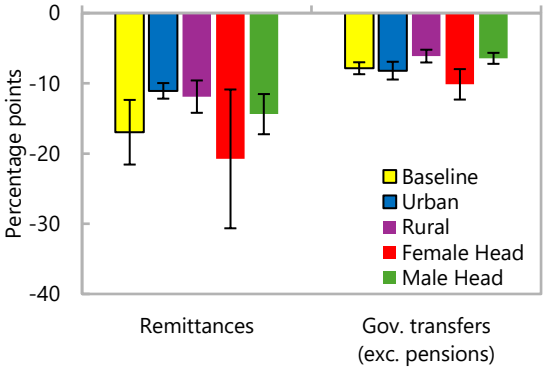


h. Household Employment Rate by Amount of Government Transfers



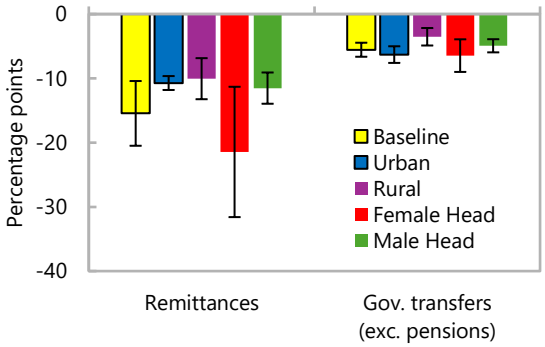
Government transfers (excluding pensions) report the share among households with no member eligible for a pension.

i. Effects on Total Employment (ATE)



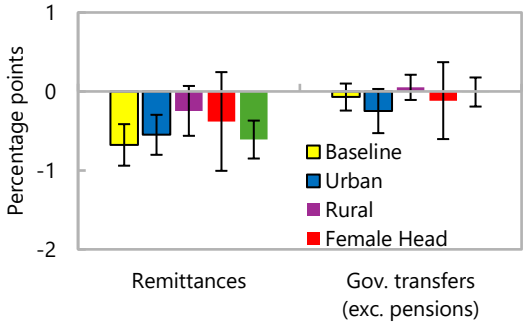
Government transfers (excluding pensions) report the share among households with no member eligible for a pension.

j. Effects on Hired Employment (ATE)



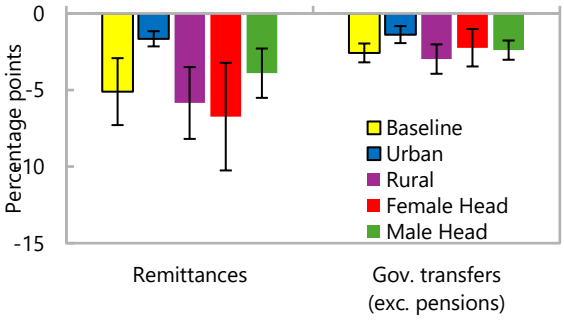
Government transfers (excluding pensions) report the share among households with no member eligible for a pension.

k. Effects on Self Employment (ATE)



Government transfers (excluding pensions) report the share among households with no member eligible for a pension.

l. Effects on Secondary Job (ATE)

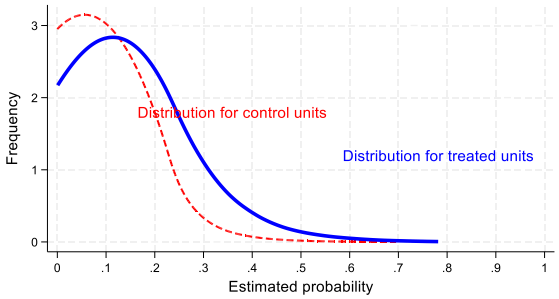


Government transfers (excluding pensions) report the share among households with no member eligible for a pension.

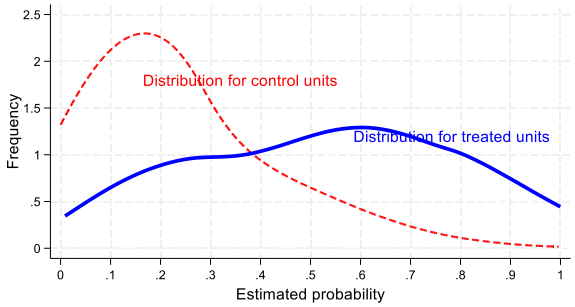
Sources: Georgian Household Income and Expenditure Surveys 2017-2024 and IMF staff calculations.

Figure 5. Propensity Scores and Covariate Balancing

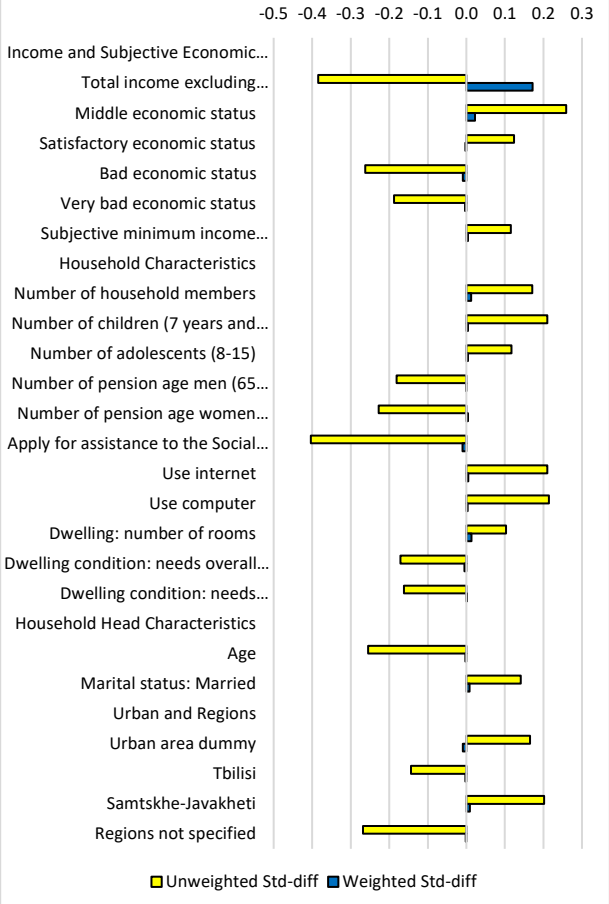
a. Estimated Probability of Receiving Remittances



b. Estimated Probability of Receiving Government Transfers

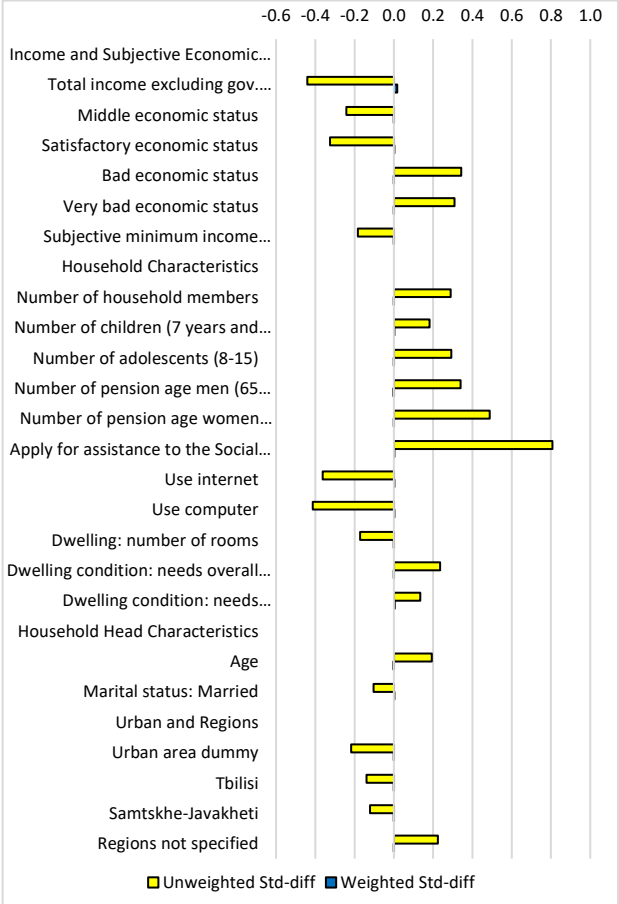


c. Covariate Balancing for Remittances



This chart shows the standardized mean differences between recipient and non-recipients of remittances

d. Covariate Balancing for Government Transfers



This chart shows the standardized mean differences between recipient and non-recipients of government transfers

Sources: Georgian Household Income and Expenditure Surveys 2017-2024 and IMF staff calculations.
Notes: Out of the 46 variables used to predict the probability of receiving remittances or government transfers, only 23 variables for which the standardized differences between the treated and control groups exceed 0.1 are presented in this figure.

References

Acosta, P. (2011). School attendance, child labour, and remittances from international migration in El Salvador. *Journal of Development Studies, 47*(6), 913–936. https://doi.org/10.1080/00220388.2011.563298

Alcaraz, C., Chiquiar, D., & Salcedo, A. (2012). Remittances, schooling, and child labor in Mexico. *Journal of Development Economics, 97*(1), 156–165. https://doi.org/10.1016/j.jdeveco.2010.11.004

Borjas, G. J. (2020). *Labor economics* (8th ed.). McGraw-Hill Education.

Dasgupta, P., & Ray, D. (1986). Inequality as a determinant of malnutrition and unemployment: Theory. *The Economic Journal, 96*(384), 1011–1034.

European Training Foundation (ETF). (2019). Skills Mismatch Measurement in Georgia.

European Training Foundation (ETF). (2022). Skill Mismatch Measurement in ETF Partner Countries.

Flisi, S., V. Goglio, E. C. Meroni et al. (2017). Measuring Occupational Mismatch: Overeducation and Overskill in Europe—Evidence from PIAAC. *Social Indicators Research*, 131, 1211–1249. https://doi.org/10.1007/s11205-016-1292-7

Handel, M. J., A. Valerio, and M. L. Sanchez Puerta. (2016). Accounting for Mismatch in Low and Middle-Income Countries: Measures, Magnitudes, and Explanations. World Bank.

Kraay, A., & McKenzie, D. (2014). Do poverty traps exist? Assessing the evidence. *Journal of Economic Perspectives, 28*(3), 127–148.

Kupets, O. (2016). Education in Transition and Job Mismatch: Evidence from the Skills Survey in Non-EU Transition Economies. *The Journal of Comparative Economic Studies*, Vol 11, pp: 117-150.

Mendola, M., & Carletto, C. (2012). Migration and gender differences in the home labour market: Evidence from Albania. *Labour Economics, 19*(6), 870–880. https://doi.org/10.1016/j.labeco.2012.08.009

Posso, A. (2012). Remittances and aggregate labor supply: Evidence from sixty-six developing nations. *The Developing Economies, 50*(1), 25–39. https://doi.org/10.1111/j.1746-1049.2011.00153.x

Rutkowski, J. (2013). Workforce skills in the eyes of the employers: Results of the Georgia STEP employer skills survey. World Bank

Woodruff, C., & Zenteno, R. (2007). Migration networks and microenterprises in Mexico. *Journal of Development Economics, 82*(2), 509–528. https://doi.org/10.1016/j.jdeveco.2006.03.006

World Bank. (2013). Georgia – Skills mismatch and unemployment labor market challenges.

World Bank. (2015). *The impact of targeted social assistance on labor markets in Georgia*. World Bank Group.

World Bank. (2018). Georgia at Work: Assessing the Jobs Landscape.

World Bank. (2025). From Learning to Earning: How Skills Power Productivity in Europe and Central Asia.

Yang, D. (2008). International migration, remittances and household investment: Evidence from Philippine migrants' exchange rate shocks. *The Economic Journal, 118*(528), 591–630. https://doi.org/10.1111/j.1468-0297.2008.02134.x

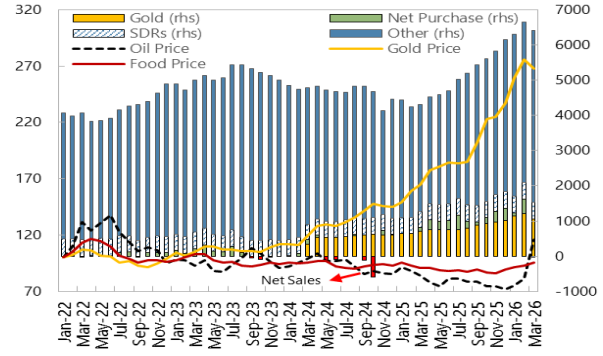
RESERVE ADEQUACY IN GEORGIA: HOW MUCH IS ENOUGH?[1]

This paper assesses the optimal level of international reserves ("reserves") for Georgia in a context of elevated external uncertainty. While reserve coverage has recently reached conventional adequacy thresholds, these benchmarks may not fully capture country-specific vulnerabilities and policy needs. Building on a standard cost-benefit framework for reserves, the analysis incorporates three additional channels: sovereign borrowing costs, private-sector dollarization, and the need for foreign exchange intervention (FXI) to smooth excessive exchange rate volatility associated with shallow FX markets. The results imply that reserves provide broader insurance and credibility benefits than suggested by standard metrics. Accordingly, the optimal level of reserves is estimated at around 145–150 percent of the ARA metric, exceeding standard adequacy benchmarks. These findings point to scope for additional opportunistic reserve accumulation to further strengthen resilience and reach optimal levels.

A. Introduction

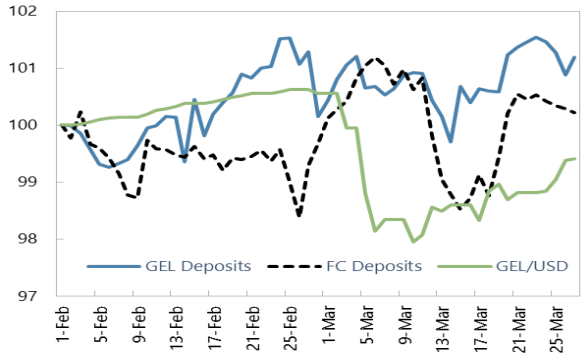
1. Reserves in Georgia have increased markedly in 2025, bringing coverage to conventional adequacy levels. After remaining below the IMF's Assessing Reserve Adequacy (ARA) threshold for several years and coming under pressure during the October 2024 parliamentary elections, Georgia's reserves recovered to 100 percent of ARA by end-2025, supported by strong services exports, higher gold prices, and de-dollarization (Figure 1). Continued reserve accumulation by the central bank strengthened market confidence, facilitating a successful Eurobond refinancing in early 2026. Despite recent increases in energy prices linked to the war in the Middle East and potential pressures on the current account, the exchange rate has remained broadly stable, indicating improved confidence in the lari, partly reflecting stronger reserve buffers (Figure 2).

Text Figure 1. Gross International Reserves, FXI, and Commodity Prices
(LHS: Index, Jan 2022=100; RHS: Millions, USD)



Sources: World Economic Outlook, Haver Analytics, and the National Bank of Georgia.

Text Figure 2. Deposits and Exchange Rate
(Index, Feb 1st, 2026=100)



Sources: Georgian authorities, Haver Analytics, and IMF staff calculations.

[1] Prepared by Mehmet Cangul (SPR) and Will Abel (MCD).

2. Reserves in Georgia could increase to 145–150 percent of the ARA metric to reach optimal levels. The accumulation of reserves by EMs can be viewed as a form of self-insurance against a range of external shocks, including capital outflow volatility, terms-of-trade shocks, and shifts in global financial conditions. Jeanne and Rancière (2011) propose a cost-benefit framework for reserve accumulation (the "baseline" framework), in which the opportunity cost of holding reserves in normal times is weighed against the benefit of using them to smooth consumption during crises that occur with a given probability. Building on this framework, the analysis assesses Georgia's optimal level of reserves by incorporating three key channels relevant to its economy: (i) sovereign risk; (ii) private-sector dollarization; and (iii) FXI-related liquidity needs (Chen and others, 2023).

B. Analytical Framework: Baseline and Extensions

3. In the baseline framework, optimal reserve holdings reflect a trade-off between the insurance benefits of reserves in a crisis and their opportunity cost in normal times. The model considers a small open economy facing a stochastic risk of a sudden stop in capital inflows. In such episodes, external financing dries up, requiring an abrupt adjustment in consumption unless sufficient reserves are available to smooth the shock and limit the long-term economic costs. A benevolent social planner chooses reserves to maximize expected utility under constant relative risk aversion (CRRA). Reserves provide insurance by smoothing consumption in crisis states but entail an opportunity cost in normal times, captured by the spread between the return on safe reserve assets and the cost of external borrowing. The simplified formula from the original paper is used to calibrate the main parameters of the model to Georgia:

$$\rho = \lambda + \gamma - (1 - \mathrm{p}^{-1/\sigma})$$

where p is the reserves to output ratio; λ is the level of private external debt as a share of GDP; γ is the output loss ratio from the sudden stop (assumed if the reserves are not used to smooth the consumption); and σ is the risk aversion parameter.[2] The baseline framework yields an optimal level of around 130 percent of ARA for Georgia, assuming a 10 percent probability of a sudden stop. This framework abstracts from differences in the liquidity of reserve assets, which may affect their effective use in practice.

Extension 1: Reserves and Sovereign Risk Premia

4. Higher reserves can reduce sovereign borrowing costs by improving market perceptions of liquidity and rollover risk. By strengthening confidence in the country's ability to meet external obligations during periods of stress, reserves increase the attractiveness of the

[2] In reserves to output ratio p =1 + $[\delta/(\pi\ (1-\delta-\pi)]$, δ represents the term premium between the interest rate of the long-term debt the government issues to finance reserves and the interest rate paid on the short-term external debt; and π is the probability of a sudden stop.

sovereign debt and reduce issuance costs. Thus, the opportunity cost of reserves may decline with higher reserves. In the baseline model, this cost is treated as exogenous and constant, but for small open economies with limited market access, this assumption may be overly restrictive. As a result, the opportunity cost of reserve accumulation becomes state-dependent. This channel is particularly relevant for economies such as Georgia, where access to external financing is sensitive to global risk conditions and domestic liquidity buffers.

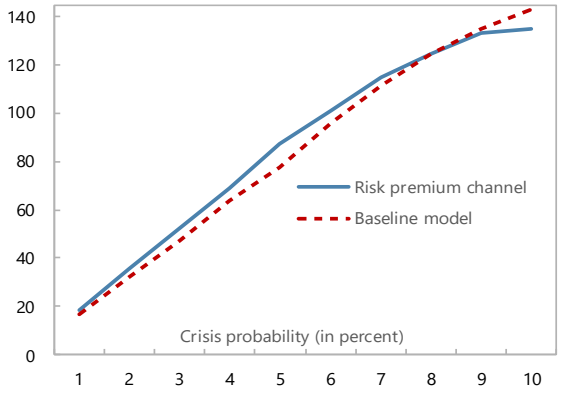
5. The negative relationship between reserve levels and sovereign spreads is well supported in the literature. Estimates suggest that a 10-percentage point increase in the reserves-to-GDP ratio can lower EM borrowing costs by around 30-70 basis points. Early contributions (e.g., Edwards, 1984; Eaton and Gersovitz, 1981) emphasize the role of liquid external assets in mitigating default risk. More recent work (Aizenman, Hutchison and Jinjarak ,2011; Bastourre, Carrera and Ibarlucia, 2012; and Alfaro and Kanzcuk ,2009) finds that higher reserves are associated with lower borrowing costs, particularly during periods of global financials stress. These effects are non-linear: reserve accumulation yields large reductions in spreads at low reserve levels, while marginal benefits diminish once reserves exceed standard adequacy thresholds.

6. Motivated by these findings, we extend the baseline framework by allowing the opportunity cost of reserves to depend on reserve holdings. The effective opportunity cost of reserves declines with reserve accumulation, albeit at a diminishing rate, altering the trade-off between the insurance benefits and the opportunity cost of reserves. This mechanism is captured by the effective marginal cost of reserves:

$$\delta(R) + R \cdot \delta'(R)$$

where the first term reflects the direct cost of holding reserves, while the second term captures the reduction in borrowing costs induced by higher reserves.[3] For Georgia, incorporating this channel raises optimal reserves by about 5 percent of ARA at lower crisis probabilities, although the effect diminishes and can reverse as reserve levels increase since borrowing-cost benefits exhibit diminishing returns. At a 10 percent crisis probability, the net effect is about 8 percent of ARA lower than the baseline framework (Figure 3).

Text Figure 3. Baseline and Risk Premium Extension (In percent of ARA)



Sources: National authorities and IMF staff estimates.

Extension 2: Reserves and Dollarization

7. In highly dollarized economies, private agents hold foreign currency as a form of self-insurance against macroeconomic and financial risks. While individually optimal, this behavior

[3] See Annex 1 for technical details.

generates aggregate distortions, including currency mismatches, weaker monetary policy transmission, and heightened vulnerability to exchange rate depreciation. In such settings, public international reserves and private FX holdings can act as partial substitutes. Stronger reserve buffers reduce incentives for precautionary dollarization by private agents, by enhancing the credibility of the central bank's capacity to supply FX liquidity during stress episodes. Conversely, when reserves are perceived as insufficient, private agents increase foreign currency holdings, amplifying balance-sheet risks and the severity of crises. By ensuring the availability of FX liquidity in adverse states, reserves act as a collective insurance device that mitigates coordination failures and reduces the need for excessive private self-insurance.

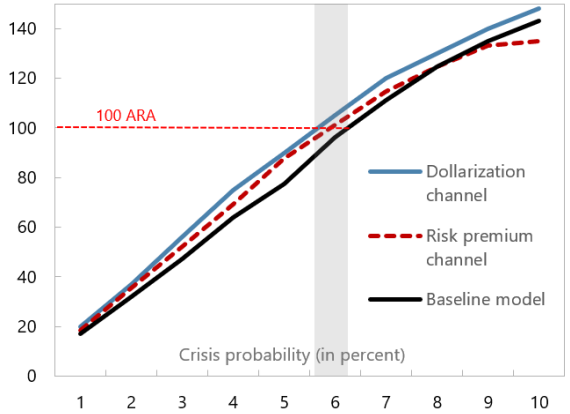
8. This mechanism is well supported by the literature on financial dollarization. Research identifies weak monetary credibility, exposure to exchange rate shocks, and underdeveloped local currency financial markets as key drivers of dollarization (Ize and Levy-Yeyati, 2003; De Nicolo, Honohan, and Ize 2005). In such environments, households and firms rationally choose FX assets and liabilities to hedge against inflation and depreciation risks, even though these choices may amplify systemic vulnerabilities. A growing body of work finds that stronger reserve buffers can partially substitute for private self-insurance by reducing the perceived probability and severity of balance-sheet crises (Obstfeld, Shambaugh, and Taylor, 2010; Bianchi, Hatchondo, and Martinez, 2018). Empirically, higher reserve adequacy is associated with lower financial dollarization and reduced exchange rate pass-through, particularly in emerging markets with improving policy credibility (Levy-Yeyati, 2006; Garcia-Escribano and Sosa, 2011; IMF, 2015, 2020).

9. We extend the baseline framework to incorporate the interaction between public reserves and private dollarization decisions, following Gonçalves (2020). In this setting, higher reserves reduce incentives for private agents to hold foreign currency, reducing balance-sheet mismatches, mitigating consumption losses in crisis states as well as decreasing the effective opportunity cost of reserves through lower private FX demand. This reflects the role of reserves in substituting for private self-insurance and reducing the severity of crises. We allow crisis losses to depend on reserves via dollarization:

$$\Delta C(R) = \Delta C(D(R))$$

where dollarization $D(R)$ declines with reserves. For Georgia, incorporating this mechanism raises optimal reserve holdings by about 18 percent of ARA at a 10 percent crisis probability.[4] The dollarization channel becomes dominant at relatively low reserve levels (below 100 percent of ARA), raising optimal reserves above both the baseline and the sovereign-risk extension (Figure 4).

Text Figure 4. Baseline and All Extensions
(In percent of ARA)



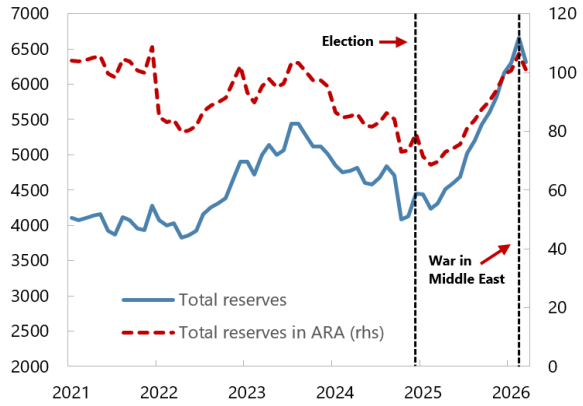
Sources: National authorities and IMF staff estimates.

[4] See Annex I for technical details.

Extension 3: Reserves and FXI

10. The last extension accounts for reserve needs associated with FXI aimed at smoothing excessive exchange rate volatility. An additional "working liquidity" may be required for this need above the level of reserves held purely for crisis insurance. To quantify this additional need, we use the model developed by Chen and others (2023) estimated on Georgian data for 2005-2024. The framework incorporates a quantitative integrated policy framework (QIPF), capturing the effect of relatively shallow FX markets, which implies that exchange rates may at times overshoot—even outside crisis episodes—due to shifts in market sentiment, providing a potential rationale for FXI.

Text Figure 5. History of Gross International Reserves
(LHS: million, USD; RHS: in percent of ARA)

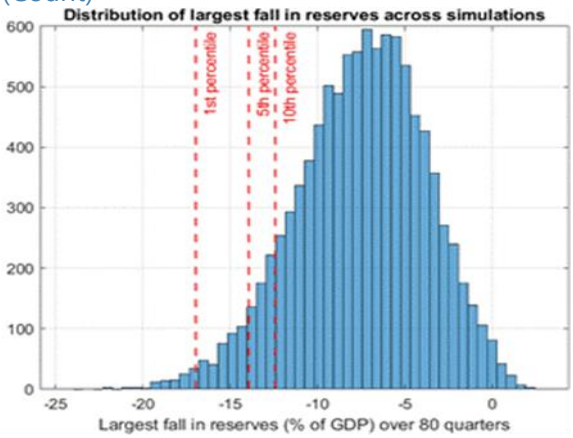


Sources: National Bank of Georgia.

11. FXI is occasionally used by the NBG to reduce excessive exchange rate volatility. This approach was assessed in the 2025 Article IV staff report through the lens of the IMF's integrated policy framework (IPF).[5] A recent episode ahead of the 2024 parliamentary elections illustrates this practice when FXI was deployed to reduce volatility in the lari. This resulted in a substantial drawdown of reserves – around USD 750 million or approximately 10 percent of the ARA metric (Figure 5).[6] While reserves have since been rebuilt to more comfortable levels, the episode highlights that FXI can put pressure on buffers and may warrant holding additional reserves beyond minimum precautionary levels.

12. Model simulations suggest that FXI may require additional reserves of up to 10 percent of the ARA metric as working liquidity to smooth exchange rate volatility. This estimate is obtained by simulating the estimated model 10,000 times over a 20-year period, with and without FXI, and comparing the resulting reserve drawdowns (Figure 6). A caveat is that these estimates partly reflect double counting, as the shocks driving FXI in the QIPF framework may overlap with stress scenarios

Text Figure 6. FXI Simulations
(Count)



Sources: National authorities and IMF staff estimates.

[5] Georgia 2025 Article IV Consultation-Press Release; and Staff Report", IMF Staff Country Reports 2025, 216 (2025), https://doi.org/10.5089/9798229017022.002.

[6] The ARA metric is calculated on an annual basis, so this is an approximation.

already captured in the broader model. As a result, the additional reserve need should be interpreted as an upper bound.

C. Conclusions and Policy Options

13. The level of optimal reserves for Georgia is materially higher than suggested by the baseline framework. The need for additional reserves reflects the benefits of higher reserves in reducing sovereign borrowing costs, lowering private-sector dollarization, and the demand for liquidity that may arise for FXI to smooth excessive exchange rate volatility. At a 10 percent crisis probability, the fully extended model implies an optimal reserve range of about 145-150 percent of ARA.[7] Georgia's current reserve position (102 percent of ARA) appears adequate under moderate stress scenarios and broadly in line with the sovereign-risk extension, but remains below the range suggested under higher-risk scenarios (Figure 3). At the same time, reserves composition matters for their effective use, as part of the recent increase reflects valuation effects—particularly higher gold prices—and some assets may be less liquid or more costly to deploy under stress.

14. These results suggest scope for further opportunistic reserve accumulation, particularly in a context of elevated global uncertainty. The current price-based framework governing NBG's FX purchases appears appropriate for calibrating the pace and scale of such accumulation, while allowing flexibility in response to external conditions. FXI can play a role in mitigating large swings arising from market shallowness, but should be used sparingly to allow the exchange rate to function effectively as a shock absorber.

[7] While the extended framework captures the main channels affecting reserve needs in Georgia, it abstracts from differences in the liquidity and composition of reserve assets and operational constraints that may affect the timely deployment of reserves in crisis episodes (e.g., Bussière et al., 2015; Bank for International Settlements, 2022).

References

Bank for International Settlements — Afonso et al. (2022). *How Abundant Are Reserves? Evidence from the Wholesale Payment System*. BIS Working Papers No. 1053.

Bianchi, J., Hatchondo, J.C., & Martinez, L. (2018). *International reserves and rollover risk.* American Economic Review, 108(9), 2629-2670.

Bussière et al. (2015). *For a Few Dollars More: Reserves and Growth in Times of Crises*. Journal of International Money and Finance, 52, 127–145.

Calvo, G. A., Izquierdo, A., & Talvi, E. (2006). *Sudden stops and Phoenix miracles in emerging markets.* American Economic Review Papers and Proceedings, 96(2), 405-410.

Calvo, G. A., Leiderman, L., & Reinhart, C. M. (1996). *Inflows of capital to developing countries in the 1990s.* Journal of Economic Perspectives, 10(2), 123-139.

De Nicolo, G., Honohan, P., & Ize, A. (2005). *Dollarization of the banking system: Causes and consequences.* Journal of Banking and Finance, 29(7), 1697-1727.

Durdu, C.B., Mendoza, E.G., & Terrones, M.E. (2009). *Precautionary demand for foreign assets in sudden stop economies.* Journal of Development Economics, 89(2), 194-209.

Garcia-Escribano, M., & Sosa, S. (2011). *What is driving financial dollarization in Latin America?* IMF Working Paper WP/11/10.

Goncalves, F.M. (2013). *The optimal level of international reserves in emerging market economies: Self-insurance versus public insurance.* Journal of International Money and Finance, 33,1-18.

Gourinchas, P.-O., & Obstfeld, M. (2012). *Stories of the twentieth century for the twenty-first.* American Economic Journal: Macroeconomics, 4(1), 226-265.

IMF (2011). *Assessing Reserve Adequacy*. IMF Policy Paper, International Monetary Fund.

IMF (2015). *Evolving issues in assessing reserve adequacy*. IMF Policy Paper, International Monetary Fund.

IMF (2020). *Global liquidity: Drivers, volatility, and vulnerabilities*. Global Financial Stability Report, Chapter 3.

IMF (2024). Georgia 2024 Staff Report

IMF (2025). Georgia 2025 Staff Report

Ize, A., & Levy-Yeyati, E. (2003). *Financial dollarization*. Journal of International Economics, 59(2), 323-347.

Jeanne, O. (2007). *International reserves in emerging market countries: Too much of a good thing?* Brookings Papers on Economic Activity, 2007(1), 1-79.

Jeanne, O., & Rancière, R. (2011). *The optimal level of international reserves for emerging market countries: A new formula and some applications*. Economic Journal, 121(555), 905-930.
Korinek, A., & Mendoza, E.G. (2014). *From sudden stops to financial crises: Models, mechanisms, and policy implications*. Annual Review of Economics, 6, 299-332.

Levy-Yeyati, E. (2006). *Financial dollarization: Evaluating the consequences*. Economic Policy, 21(45), 61-118.

Obstfeld, M., Shambaugh, J.C., & Taylor, A.M. (2010). *Financial stability, the trilemma, and international reserves.* American Economic Journal: Macroeconomics, 2(2), 57-94.

Reinhart, C.M., Rogoff, K.S., & Savastano, M.A.(2003). *Debt intolerance*. Brookings Papers on Economic Activity, 2003(1), 1-74.

Annex I. Technical Details

Borrowing Cost Channel:

The return on reserve assets is assumed to equal the risk-free rate r^* and the sovereign borrowing rate in international markets is given by r(R).

The opportunity cost of reserves is then defined as:

$$\delta(R) \equiv\ r(R) - r*.$$

The sovereign borrowing rate is assumed to be a decreasing and a concave function of reserves. Higher reserve buffers improve liquidity, reduce rollover risk, and strengthen perceived repayment capacity, thereby lowering sovereign risk premium. These effects exhibit diminishing marginal returns as reserves increase. A convenient reduced form representation capturing these features is:

$$\delta(R) = \delta(0) - \phi ln(1+R/Y), \phi > 0$$

Where $\delta(0)$ denotes the baseline spread in the absence of reserves and ϕ governs the strength of the reserve-spread relationship.

The policy maker chooses reserves R to maximize expected utility:

$$(1-\pi)\ \text{u(Y-}\ \delta(R)R)\ +\ \pi u(Y-L+R),$$

Where π is the probability of a sudden stop, L is the output loss in crisis states, and preferences are CRRA with coefficient of relative risk aversion γ.

The optimality condition equates the marginal insurance benefit of reserves in crisis states to their marginal cost in normal times:

$$\pi u'(Y-L+R) = (1-\pi)u'(Y-\ \delta(R)R)[\ \delta(R) + R\delta'(R)].$$

Relative to the benchmark case with an exogenous opportunity cost, the marginal cost term now includes $R\delta'(R)$, which captures the borrowing cost savings generated by additional reserves.

Because the effective marginal cost $\delta(R)\ +\ R\delta'(R)$ is decreasing in R, reserve accumulation occurs along a flattening marginal cost schedule.
Consistent with the convexity, for $\delta(R)$, we choose a reduced-form specification from the sovereign spread literature:

$$\delta(R) = s0 - k\ log(1+R/Y)$$

Where S0 represents the initial spread for Georgia and k the spread elasticity.

The first order condition is derived by equating the marginal benefit of reserves to their marginal cost:

Marginal cost is defined as: MC = $\rho + S0 - k \log(1+R/Y) - (k(R/Y)/\ 1 + (R/Y))$

Marginal benefit is defined as MB = $(\pi/1-\pi)\ (\Delta C/\ R)$

This first order condition then becomes:
$(\pi/1-\pi)\ (\Delta C/\ R) = \rho + S0 - k \log(1+R/Y) - (k(R/Y)/\ 1 + (R/Y))$

This boils down to the following equation that does not have a closed form solution.
$F(R) = (\pi/1-\pi)\ (\Delta C/\ R) - [\rho + S0 - k \log(1+R/Y) - (k(R/Y)/\ 1 + (R/Y)))$

However, fixing values for ΔC , S0, and P, at their initial baseline levels, and assuming a spread elasticity typical for an EM at 5.75[1] and normalizing GDP at 1, we iterate numerically for each crisis probability starting from 1.

Dollarization Channel:

Let D (R) ϵ [0,1] denote the degree of private dollarization declining with reserves:

D′(R) <0

Crisis consumption losses depend positively on dollarization:

$$\Delta C\ (D)\ with\ \Delta C'\ (D) > 0$$

Thus, the GDP-loss channel is reserve dependent:

$$\Delta C(R) = \Delta C(D(R))$$

The social planner maximizes expected welfare where the opportunity cost is further reduced from the higher reserves-lower dollarization channel:

$$W(R) = -\ 1(-\pi)\ (\rho + \delta)R\ -\ \pi\Delta C(D(R))$$

[1] This corresponds to a conservative mid-range calibration of a 50 basis point reduction per 10 pp of higher reserves, (Edwards 2004; IMF 2015; Bianchi et al. 2018): $\Delta s\ \approx k\ log\ (\ (1 + 0.20)\ /\ 1 + 0.10)\ )$

Taking the derivative of the welfare function with respect to reserves yields the first-order condition:

$$dW / DR = -1(-\pi)(\rho + \delta) - \pi\Delta C'(D'(R)) = 0$$

Rewriting, the planner equates the marginal benefit of reserves to their effective cost:

$$\frac{\pi}{1-\pi}\frac{\Delta C\,(R)}{R} = \rho + \delta - \frac{\pi}{1-\pi}\Delta C'\,(D)D'(R)$$

The left-hand side is the expected marginal loss in a crisis; the right side includes both the baseline opportunity cost and the dollarization benefit. Now, we can incorporate the work above on reduced borrowing cost to rewrite the effective opportunity cost:

$$\frac{\pi}{1-\pi}\frac{\Delta C\,(R)}{R} = \rho + \delta\,(R) + R\delta'(R) - \frac{\pi}{1-\pi}\Delta C'\,(D)D'(R)$$

Now, the right-hand side includes net cost of holding reserves, reduced by dollarization benefits and the endogenous spread compression.

$D(R) = \overline{D} - \eta\ log\ (1+R), \eta > 0$

$$\overline{D} = 0.6\ (baseline\ private\ dollarization)$$
$$\eta = 0.10\ (reserve\ responsiveness)$$

And for crisis loss amplification, we define:

$$\Delta C(D) = \overline{\Delta c}\ (1 + \lambda D)$$

And where:

$$\overline{\Delta c} = 10 percent of GDP (baseline GDP loss)$$
$$\lambda = 0.5\ (dollarization\ amplification\ parameter)$$

Thus, the dollarization term in the first order condition becomes:

$$\delta D(R) = \frac{\pi}{1-\pi}\ \lambda\overline{\Delta c}\ \frac{\eta}{1+R}$$

Finally, putting everything together, and substituting terms to our first order condition, we can re-calibrate for different probability levels with the same parameters as used in the lower borrowing cost extension but endogenizing the dollarization channel through lower GDP loss and also a lower opportunity cost.