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Population Ageing and Federal Transfers: A Reform Agenda for the Finance Commission in India

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Population Ageing and Federal Transfers: A Reform Agenda for the Finance Commission in India

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Abstract

Many Indian states that are at mature stages of demographic transition face significant fiscal challenges posed by faster demographic transition or population ageing. Currently, the Finance Commission's horizontal tax-sharing (devolution) criteria do not account for the disproportionate burden of public expenditure on states that are ageing relatively faster than the national average. Observing the severity of the issue and its omission in current devolution criteria, the study proposes incorporating the share of the population aged 60 and above as an explicit factor in the devolution formula to improve the fairness in the horizontal transfer of central taxes. This adjustment aims to account for the unequal fiscal burden of public expenditure resulting from the varying pace of ageing across states. If all states aged uniformly from the same baseline, then such an issue would not arise. The proposed formula has an insignificant effect on the progressivity of fiscal transfers achieved by the existing formula, suggesting it is a credible alternative to the existing mechanism.

Key Words: Fiscal Federalism, Tax Devolution, Demographic Transition ,Population Ageing.

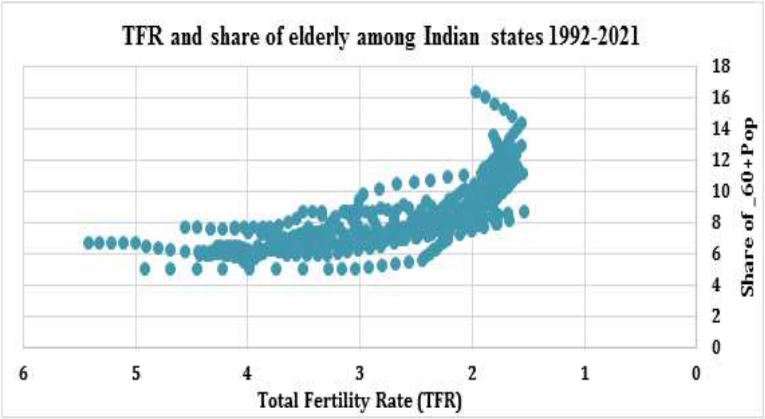
I. Demographic Dynamics in India

India's demographic transition exhibits some unique characteristics, differing somewhat from the global experience. This means states exhibit diverse stages and pace of demographic transition. The official population projections (Population Projection for India and States 2011-2036, 2020) indicate that the country will be transitioning from a very young to a middle-aged country by 2036. However, this aggregate national trend does not uniformly apply to Indian states. Whilst several Indian states have already achieved below Replacement Level Fertility rates (RLF)[1], some states such as Uttar Pradesh, Madhya Pradesh, and Bihar continue to have high population growth on account of high fertility rate and are projected to continue with this trend even beyond 2036 (National Commission on Population, 2020). However, regional diversity in India's demographic transition poses challenges to its fiscal federal arrangements, which are currently in place.

Numerous scholars have highlighted the inverse relationship between the Total Fertility Rate (TFR) and the ageing population (Heintz & Folbre, 2021). A simple graphical representation (Figure 1) illustrating the relationship between TFR and the proportion of the 60+ population across Indian states reveals a negative relationship between these two variables. States that achieved population stabilisation and reached the Replacement Level Fertility (RLF) earlier tend to have a higher share of the 60+ population in their total population.

[1] Replacement-level fertility is the total fertility rate (TFR) needed for a population to maintain its size, generally around 2.1 children per woman.

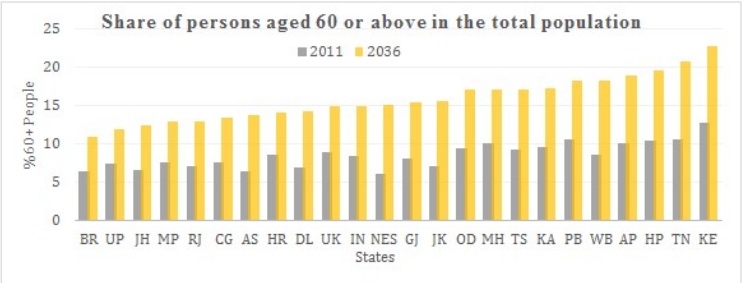
Figure 1: TFR and share of elderly among Indian states



Source: Global Data Lab, Census of India, and National Commission on Population Report 2019

Looking into the state-level statistics (Figure 2), we see that states like Kerala and Tamil Nadu etc. have a higher proportion of the elderly (60 and above years) population in the total population.

Figure 2: Share of persons aged 60 or above in the total population



Source: National Commission on Population Report 2019. #NES-Northeastern States

In the case of Kerala, the share of elderly persons was 13% in 2011. According to the projections by the National Commission on Population, it is expected to increase to 23% by 2036. That is, every fourth individual in Kerala is expected to be a senior citizen by 2036. Similarly, all south Indian states, Himachal Pradesh, Punjab, and West Bengal are expected to have an increased proportion of aged people in their total population by 2036. On the other hand, states like Bihar, Uttar Pradesh, Jharkhand, Madhya Pradesh, and Rajasthan will have the lowest share of the elderly population in the total population. The increased share of the elderly population in the former set of states poses distinct challenges for their public finances.

II. Fiscal and Economic Dimensions of Population Ageing

In a fiscal federal system, the differential rate of demographic transition among states implies that, states with faster transition may face significantly limited opportunities in generating revenue, but disproportionately higher responsibilities on the expenditure side until all states have converged in their demographic structure (Bodnár & Nerlich, 2022; Kluge & Vogt, 2020; Dhillon & Ladusingh,, 2017). This is particularly true in the Indian context, where the constitution places most of the demographically driven expenditure, such as health, pensions, and social security, largely under the responsibility of state governments. Though the constitution provides for statutory transfers to address all sources of fiscal imbalances, the existing resource transfer mechanism through the Union Finance Commission (UFC) overlooks the growing horizontal imbalance that is accentuating with each

passing year[2]. Assuming that ageing independently influences expenditure responsibilities of states, it directly affects the horizontal equity, given the stark inter-state variation in ageing patterns. A fiscal federal arrangement that does not address this factor will invariably be biased against states with a higher 60-plus population, as they face greater expenditure needs without a commensurate increase in revenue capacity.

Notably, state revenue capacity is heavily reliant on indirect taxes, with GST, driven by consumption levels in state economies, being the dominant source. States undergoing faster population ageing may experience slower consumption growth, as elderly persons tend to reduce consumption upon exiting the labour market, thereby constraining indirect tax revenues. On the contrary, the Centre's revenue growth may not experience that significant decline because more than 56% (in 2023-24) of the Centre's revenue is sourced through direct taxes, which are levied on income or profit instead of consumption. This implies that even in ageing states, income and corporate tax collections may continue to grow if states experience productivity growth.

This also implies there is an inherent tendency for the growth of vertical (centre-state) inequality in revenue opportunities as states develop economically. As per capita incomes of states rise, the average propensity to consume of those states will naturally decline, implying a relatively reduced level of consumption, which in turn would lead to a reduced own tax revenue to GSDP ratio,

[2] There are two operating channels for transfer of resources from the union government to the states in India: (i) statutory transfers through the awards of the finance commission, comprised of (a) formula-based tax devolutions and (b) General purpose grants (c)Specific purpose grants (ii) discretionary transfers by various union ministries.

which is largely based on GST collection. In other words, states that transit faster either in terms of income or demography or both will invariably face reduced opportunities to collect taxes in proportion to the size of their economy, as such transitions can reduce the consumption growth, which is the primary driver of a state's own revenue. On the expenditure side, however, these transitions increase pressure on state governments to meet the rising aspirations and needs of their population. Consequently, the double-sided challenge faced by faster-transiting states merits serious consideration in forthcoming UFC deliberations.

This leads us to our specific research question: If states with a higher share of 60 plus population face a relatively larger expenditure burden, what fund devolution mechanisms can be designed to address this challenge? So far, such concerns have not been part of the fund devolution formula of the UFC. To address the research question, we take the 15th Finance Commission's (FC) horizontal devolution formula as a reference point. We propose a modified version of this formula to address the issue of fiscal equity among states with different demographic transition trajectories. While modifying the devolution formula to develop a more equitable devolution strategy, we ensure that the progressivity of horizontal transfers is maintained. The objective of this study is to propose an optimal fund devolution strategy that addresses horizontal equity concerns emerging from the interstate differences in demographic transition.

The empirical analysis of this paper is divided into two parts; The first part involves conducting a sensitivity analysis of each state's share in tax devolution. This analysis will be carried out by assigning hypothetical weights to the age structure of the population. The modelling will incorporate a constraint to ensure

that the progressivity of horizontal devolution is maintained at least at a level embedded in the current formula. In the second part, we assess the progressivity of the proposed tax share formula to ensure that the new formula continues to uphold a progressive structure.

III. Evolving Role of Population in Devolution Criteria

Population has historically been one of the most important criteria for inter-state sharing of income tax and Union excise duties, receiving weightages between 80% and 100%, in different FC's till the early eighties. This emphasis reflected the view that population size is the most important determinant of fiscal needs of a state, i.e., the larger the population, the greater the need for public resources and services. However, the 8th FC (1984-89) significantly reduced the weightage assigned to population to 25%. In continuation of this trend, the Fifteenth Finance Commission assigned a 15% weightage to population as a criterion for devolution. But the 15th FC proposed a shift in the methodology for horizontal devolution by using the 2011 census as the base for tax sharing. This marks a departure from the longstanding practice of relying on the 1971 census figures. As rightly noted by (Bhattacharjee & Bhattacharya, 2021),This approach tends to penalize states that have effectively managed their population growth, as outlined in the National Population Policy of 1976. Particularly, those states with a higher proportion of elderly people may suffer the most.

The population criteria have a twofold impact on the horizontal share of states that successfully transitioned to a low fertility regime. Firstly, a declining share of these states in the total population due to lower fertility results in reduced allocation from

UFC as per the current devolution formula. Secondly, population serves as a scaling factor in assessing the distance of per capita income and tax effort. Due to these two effects, states such as West Bengal, Andhra Pradesh, and Tamil Nadu underwent substantial decreases in UFC's devolution, with West Bengal registering the most significant decline followed closely by Andhra Pradesh and Tamil Nadu. In contrast, Uttar Pradesh, Bihar, and Rajasthan emerged as the primary beneficiaries, experiencing substantial increases in their inter-state shares.

Demographic transition may seemingly appear to be a "rich states" problem because states that currently have a higher share of the 60-plus population are relatively well-to-do. However, this is not necessarily the case now and most likely in future as well. For instance, poorer states like Odisha and a middle-income state, West Bengal, have already achieved replacement-level fertility (RLF). Further, states in the northeastern part of India, such as Assam, have already achieved RLF. The average Total Fertility Rate (TFR) for the northeastern states, as per the 2020 population projection report, is 1.70, lower than the replacement level fertility. Therefore, not accounting for demographic structure within the devolution formula will affect these low and middle-income states soon.

Demographic transition at considerably low levels of economic productivity or per capita income poses even more serious concerns. This is because the working age population, due to overall low wage rates owing to low productivity in these states, seems to be struggling for their own survival, let alone sharing some of their income for the elderly. Further, in such a situation, states too have limited scope for generating revenues. Therefore, it is essential to address this challenge in establishing an optimal

fund devolution framework to prevent states undergoing rapid demographic transitions from bearing an unwarranted burden of increased expenditure responsibilities. To address this concern, our proposed suggestion involves the UFC considering the age structure of the population as a horizontal devolution formula. This approach involves assigning weightage to the percentage of the population aged 60 and above in the total population, introducing a more nuanced method for resource allocation. This approach will address the demographic realities and ensure a more equitable distribution of financial resources among the states.

IV. Exploring the Inclusion of Population Ageing as a Variable in FC's Devolution Strategy

Here, we have incorporated a new variable denoted as the "share of 60 and above in the total population," derived from the 2011 census data in the FC formula. This variable is assigned different weightages of 2.5 %,5%, and 7.5% in the overall horizontal devolution calculation. As part of this adjustment, we have decreased the weightage assigned to the total population (as stipulated in the 15th FC). To avoid the issue of double counting, the population considered for this adjustment is limited to individuals falling within the age bracket of 0-59. This measure does not disturb the existing level of distribution to a great extent. We present the details of the existing and the proposed formula in Table 1. Other than modifying the population variable, we do not make any other changes in the 15th FC formula. There is an obvious question of using dependency ratio instead of using ageing population. The argument is that both of these demographic segments do not contribute productively to the economy and therefore needs to be considered together when considering different aspects of demography. We need to take

cognisance of the fact that children below 15 years is already counted and taken care of through various policies. There exist various schemes under both the Union and State governments, as well as the FC's sector-specific grants, that address various aspects of the lives of the younger population, such as health and education. While the elderly population is acknowledged, their specific needs are not sufficiently addressed through policy initiatives, aside from the old age pension for low-income households.

The Indira Gandhi National Old Age Pension Scheme (IGNOAPS), a key social security initiative for the elderly, places a significant financial burden on state governments, as its funding is shared between the central and state authorities. Under IGNOAPS, the central government provides Rs.200 per month for individuals aged 60-79 years and Rs.500 for those aged 80 and above, with additional top-ups from state governments. However, several states, such as Haryana, Andhra Pradesh, and Punjab, contribute significantly more than the central government's share, with pensions ranging from Rs.2700 to Rs.3000, where Rs.200 or Rs.500 is from the central government. In addition to this central program, most states operate at least two state-specific welfare pension schemes for the elderly, fully funded by state governments. Beyond social security pensions, states also run old age care programs, for example, the *Sayamprabha Homes* in Kerala.

For the overall development of society, it is essential to give greater attention to the elderly. Addressing the challenges of an ageing population requires adequate fiscal space for state governments. This can only be achieved through more equitable fiscal transfers from the UFC and an increased share of the Union's contribution to centrally sponsored programs for the

elderly. Therefore, we propose an alternative tax devolution formula that takes into account the challenges of population ageing.

Table-I presents the comprehensive breakdown of horizontal tax share devolution resulting from the FC, based on our revised strategy. The computation of each state's share, based on individual variables, adheres to the methodology outlined in Volume II Annexes of the 15th Finance Commission

Criteria	15th FC	Scenario-1	Scenario-2	Scenario-3
Income Distance	45	45	45	45
Area	15	15	15	15
Population (2011)	15	10	7.5	12.5
Demographic Performance	12.5	12.5	12.5	12.5
Population Ageing	-	5	7.5	2.5
Forest and Ecology	10	10	10	10
Tax and fiscal efforts	2.5	2.5	2.5	2.5
Total	100	100	100	100

Source: Authors' computations

The general formula for calculating each state share

The interstate share of the ith state in the tax sharing formula, S_i, is determined as the weighted sum of state shares by seven criteria — population, area, forest and ecology, income distance, fiscal and tax performance, demographic performance, and population ageing:

$S_i = \sum_{m=1}^{7} S_{im}\ \omega_m$, were

$$S_{im} = \frac{X_{im}}{\sum_{i=1}^{n} X_{im}}$$

where ω_m is the weight of the m^{th} parameter and S_{im} is the share of the i^{th} State in India as per the m^{th} parameter. X_{im} is the absolute value of i^{th} state in parameter m. The explanation and calculation method for each parameter is given below

A) Income Distance

This criterion aims to enhance the equalizing and progressive nature of the devolution formula, ensuring higher allocations for states with lower per capita income. In this context, per capita Gross State Domestic Product (GSDP) serves as a proxy for measuring the disparity in tax capacity among states. The calculation of each state's share involves considering the interstate share based on income distance, as specified in the 15th Finance Commission's Annex 6.2. Multiplying this value by the designated weightage for income distance in the total devolution formula (45%) yields each state's share based on income distance.

B) Area

Finance Commissions have consistently incorporated the area criteria in the devolution formula, justifying its inclusion based on the principle of need. The larger the geographical area, the higher the expenditure requirement for delivering services of a comparable nature. The computation of a state's share based on area involves the utilization of adjusted area shares, as specified in the 15th Finance Commission's Annex 6.2. This share is then

multiplied by the designated weightage for the area in the total devolution formula, which is set at 15%.

C) Population

The population of a state serves as an indicator of the state's needs and requisites for financial expenditure in providing services to its residents. The allotment for each state is determined by their respective share of the population in the age group of 0-59, relative to the overall population (0-59) of all Indian states. To avoid the issue of double counting, which happened in earlier study by (Singh & Chakraborty, 2024). The population considered for this adjustment is limited to individuals falling within the age bracket of 0-59.

D) Demographic Performance

This criterion aims to recognize and reward the efforts of states in improving human capital outcomes in education and health. The assessment of demographic performance involves utilizing the total fertility rate (TFR) data for all states. This calculation is achieved by employing the inverse of the TFR for each state, which is then scaled by the population data from the 1971 Census. In the total devolution formula, a weightage of 12.5 percent is allocated to demographic performance.

E) Population ageing

This criterion is introduced to prevent some of the states from shouldering an undue burden of public expenditure due to their faster pace of demographic transition rising longevity in these states vis-à-vis other states The computation of each state's

allocation based on the population ageing parameter involves determining the share of each state's population aged 60 and above in the total number of individuals aged 60 and above among all Indian states. In the total devolution formula, we have tried with different combinations (2.5%, 5%, and 7.5%) of weightages designated for population ageing. Obviously, one may plausibly argue that instead of adding a new indicator of aged population in the formula, we can just increase the weight of the inverse of the total fertility rate itself. While it is true that there is a correspondence between fertility rate and population ageing, but there may not be an exact one-to-one correspondence, particularly when life expectancy at age 60 may differ significantly across Indian states, which can affect particular states more than others. (Figure 1) demonstrates that the correspondence between TFR and population ageing is relatively weak.

While the Finance Commission has stated that the TFR criterion aims to recognize and reward states for their efforts in improving human capital outcomes in education and health, the TFR-based measure primarily reflects fertility decline rather than the broader demographic structural changes occurring within society. For example, (Das, Ghosh, & Shenk, 2023) show that TFR decline in the case of Bengal did not lead to concomitant health and education benefits. (Ghosh, Siddiqui, & Majumder, 2022) also highlighted that the phenomena of fertility decline may not be effectively delivering the development dividends that are generally expected. Notably, it fails to adequately capture the extent of population ageing, particularly the impact of increasing longevity and therefore its fiscal implications. Therefore, we argue that incorporating a new variable that directly reflects demographic structural shifts is essential to effectively address the emerging challenges faced by demographically advanced states. Further, our

analysis reveals that, increasing the weight of the inverse of total fertility rate in the transfer formula significantly reduces the progressivity of transfers.

F) Forest and Ecology

The utilization of forest cover as a criterion is grounded in the recognition that while the forest cover maintained by states yields broader ecological advantages, it also incurs opportunity costs that require compensation. The computation of state shares based on forest cover involves multiplying the inter-state share of forest and ecology (as outlined in the 15th Finance Commission's Annex 6.2) by the designated weightage for forest and ecology in the total devolution formula, which is set at 10%. There are scholars like (Narayana, et al., 2025) who criticise this criterion and argue that forest cover, whether dense or total, is an inadequate measure as it fails to accurately reflect the costs incurred by states. They suggest that an index based on revenue expenditure would be a more effective metric, as it directly accounts for the actual costs that states bear in their forest conservation efforts.

G) Tax effort.

The inclusion of tax effort as a criterion aims to acknowledge and reward states demonstrating higher efficiency in tax collection. The tax effort of states is determined by initially computing the ratio of per capita own tax revenue to per capita Gross State Domestic Product (GSDP) over the period of three years (2016-17 to 2018-19). Subsequently, this ratio is scaled by the population of the state. In the overall devolution formula, a weightage of 2.5 percent has been assigned to tax effort.

Table II: Shares of States based on the new formula.

State	States Share,15th FC formula	States Share, SN-1	States Share, SN-2	States Share, SN-3
Andhra Pradesh	4.05	4.07	4.09	4.01
Arunachal Pradesh	1.76	1.75	1.75	1.75
Assam	3.13	3.11	3.10	3.11
Bihar	10.06	9.98	9.94	10.07
Chhattisgarh	3.41	3.40	3.39	3.41
Goa	0.39	0.38	0.38	0.38
Gujarat	3.48	3.49	3.50	3.50
Haryana	1.09	1.09	1.09	1.11
Himachal Pradesh	0.83	0.84	0.84	0.83
Jharkhand	3.31	3.29	3.28	3.31
Karnataka	3.65	3.67	3.69	3.64
Kerala	1.93	1.99	2.03	1.94
Madhya Pradesh	7.85	7.81	7.79	7.86
Maharashtra	6.32	6.37	6.41	6.35
Manipur	0.72	0.71	0.71	0.71
Meghalaya	0.77	0.76	0.75	0.76
Mizoram	0.50	0.50	0.50	0.50
Nagaland	0.57	0.56	0.56	0.57
Odisha	4.53	4.54	4.55	4.52
Punjab	1.81	1.83	1.84	1.82
Rajasthan	6.03	6.00	5.98	6.06
Sikkim	0.39	0.39	0.39	0.39
Tamil Nadu	4.08	4.15	4.20	4.05
Telangana	2.10	2.11	2.11	2.09
Tripura	0.71	0.70	0.70	0.70
Uttar Pradesh	17.94	17.81	17.73	17.93
Uttarakhand	1.12	1.12	1.12	1.12
West Bengal	7.52	7.55	7.56	7.49

Source: Authors' computations based on 15th Finance Commission Report Volume-II Annexes

When we introduce a new variable called Population ageing with 5,7.5 and 2.5 weightages in the existing UFC's devolution formula, states with a higher population percentage of 60 and above are set to receive increased shares. Tamil Nadu is poised to be the primary beneficiary, with a substantial gain followed by Kerala and Maharashtra. Notably, the revised devolution formula ensures that even economically disadvantaged states like Odisha and middle-income state like West Bengal will experience positive outcome. Among these three scenarios, we believe scenario one would be a feasible one with a weightage of 5 percent for the 60+ population in the total population.

VI. Progressivity analysis current and new formula

In accordance with the study conducted by (Anand & Chakraborty, 2016), an examination was undertaken to assess the current devolution formula's progressive nature. The objective was to ascertain whether states exhibiting lower per capita Gross State Domestic Product (GSDP) tend to receive significantly larger transfers per capita, on average. To investigate this, a cross-sectional regression analysis was performed for 18 major states. The model-l employed the logarithm of per capita fund transfer to a state as the dependent variable and the logarithm of per capita GSDP as the independent variable. The regression model is as follows:

$$\text{Log}_{10}(\text{Percapita fund transfer}) = \beta_0 + \beta_1 * \log_{10}(\text{pcgsdp})$$

where: In_pct= log of Per-capita fund transfer to a state is the dependent variable

In_pcgsdp = log of per capita GSDP of a state is the independent variable

The specification that we have adopted is clearly interpretable in elasticity terms indicating that per capita transfer would reduce x% if per capita GSDP increase by 1%.

Table VI: Progressivity analysis current and new formula

VARIABLES	(1) **Existing Formula**	**(2) Proposed Formula**
In_pcgsdp	-0.379***	-0.365**
	(0.127)	(0.127)
Constant	13.19***	13.04***
	(1.501)	(1.501)
Observations	18	18
R-squared	0.356	0.340

Source: Authors' computations

Here, the hypothesis being examined is that the inclusion of a new variable, population ageing, in the existing interstate tax-sharing formula will not result in a regressive effect when compared to the current formula. We are testing whether the coefficient is significantly different from -0.38, which was the value obtained using the 15th FC's formula

The findings reveal that both the 15th FC's formula and the new formula (Scenario-1) demonstrate a progressive character. Specifically, per capita fund transfer will decline by more than 0.35% with every 1% increase in per capita GSDP under both formulas. We also find that, when it comes to progressivity, the

coefficient for the new formula is not significantly different from the existing FC tax sharing formula. This suggests that, despite a slight decrease in the value of β_1 to -0.365 from -0.379, the new formula continues to uphold a progressive structure. Notably, the inclusion of the population ageing variable will not have any impact on the overall progressivity of UFC's Tax sharing formula, as the change in coefficient value is due to the standard error only.

VII. Concluding Remarks and Policy Suggestions

We propose an adjustment to the FC's devolution formula to incorporate the share of the population aged 60 and above, aiming to mitigate the fiscal challenges posed by demographic transition. In the new formula, we introduced a variable called population ageing to account for the differential nature of demographic transition among the Indian states, with a weightage of 5 %. The new formula seeks to address the potential inequities arising from the varying pace of ageing among states. From the analysis, we demonstrate that the inclusion of the population ageing variable results in a slight increase in the devolution shares of states with higher elderly populations. However, the newly proposed formula has limited impact on the overall progressivity of fiscal transfers and therefore could be considered as an alternative to the existing mechanism.

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