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ABSTRACT

Integrating Social Insurance and Social Assistance Programs for the Future World of Labor

Given the prevalence of informal labor, most countries have combined contributory social insurance programs (pensions, unemployment benefits, and health insurance), with non-contributory insurance programs and several types of "safety nets." All of these programs involve different types of subsidies and taxes, sometimes implicit. Because of design problems and the lack of coordination/integration between programs, these subsidies/taxes tend to cause four problems: 1) they can reduce incentives to contribute to mandatory insurance programs and to create formal jobs; 2) they can be regressive since redistribution often benefits middle/high income workers more than low income workers 3) they do not provide continuous protection as workers change occupations and constrain rather than facilitate, labor mobility; and 4) coverage tends to exclude many informal sector workers in the middle of the income distribution. As such, existing programs are not well prepared to deal with a world of labor characterized by persistent low productivity jobs, more frequent labor market transitions including across sectors and geographic regions and higher equilibrium unemployment rates for some groups of workers. This paper develops a policy framework to integrate, in a transparent way, the insurance function (actuarially-fair risk pooling or savings) and the redistributive function (transfers) of the social protection system in order to expand coverage, improve equity, and reduce labor market distortions. We illustrate this type of integration with the case of old-age pensions which is typically the most important intervention, at least from a fiscal perspective.

JEL Classification: H24, J26, J46, J65, J32, I13, H53, H55

Keywords: social insurance, social assistance, universal basic income, jobs, pensions, future of work, COVID-19

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Introduction

Given the prevalence of informal jobs in developing countries, Bismarckian social insurance programs (pensions, health insurance, and unemployment benefits) have failed to provide sufficient coverage and protection. They might have, in fact, become a barrier to formal employment given the level of labor taxes required to fund the programs. As a result, many countries, including low income countries, have introduced non-contributory arrangements to cover those outside the contributory system; informal wage employees and the self-employed[1]. The prevalence of very low productivity jobs has also required having in place different types of anti-poverty or "safety net" programs (e.g., conditional and unconditional cash transfers, and food subsidies).

Both contributory and non-contributory programs involve some type of redistribution. Many pension systems for instance, offer minimum pension guarantees that are financed, implicitly, through labor taxes. In the majority of social health insurance schemes workers do not pay the expected cost of the package of health services they and their families receive. For some, these contributions are above the expected cost of the plan (a tax) and for others they fall below (a subsidy). All social assistance programs offer cash transfers or subsidized goods and services which are financed from general revenues or excise taxes.

As a result, most countries have evolved a complex patchwork of social protection programs that redistribute a substantial share of their gross domestic product. However, because of the number of programs, the lack of transparency and coordination among them, sometimes poor design, and the artificial distinction between "insurance" and "assistance" , current redistributive arrangements tend to cause four problems: *1) they can reduce incentives to*

[1] This has been especially notable in recent years for health insurance schemes. See Cotlear et al (2015).

contribute to mandatory insurance programs and to create formal jobs; 2) they can be regressive since redistribution often benefits middle/high income workers more than low income workers 3) they do not provide continuous protection as workers change occupations and constrain rather than facilitate, labor mobility; and 4) coverage tends to exclude many informal sector workers in the middle of the income distribution (see Ribe et al., 2010; Frolich et al., 2014; Robalino and Weber, 2016; and Ravallion et al., 2018). Therefore, as currently designed, existing programs are not well prepared to deal with a world of labor that might be characterized by: lower levels of wage employment (where mandatory contributions work); the persistence of subsistence and low productivity jobs; more frequent labor market transitions including across sectors and geographic regions; and higher equilibrium unemployment rates for some groups of workers.

In this paper we develop a policy framework to integrate redistributive arrangements within social insurance and social assistance programs and, as result, expand coverage, improve incentives to create formal jobs and save, improve equity, and facilitate labor market transitions, including moving in and out of unemployment.

Although the framework presented in the paper applies to the entire social insurance system, we illustrate its design and implementation (including issues related to fiscal impact) using the case of old-age pensions. We argue that the distinction between social insurance and assistance programs is not helpful from a policy point of view. Social assistance programs are a form of insurance where benefits are financed from general revenues instead of individual contributions/premiums. At the same time, all social insurance programs require redistributive arrangements if they are to cover individuals who cannot afford the level of savings/premiums needed to smooth consumption and/or prevent consumption from falling below a given minimum

in the presence of different shocks. Thus, an *integrated social insurance system* should, by design, cover those who are *already* poor (or sick) or at risk of becoming poor by subsidizing consumption (through cash-transfers) and premiums/contributions to purchase health insurance and fund pensions and unemployment benefits.[2] In the case of pensions, for instance, we propose an integrated system that offers three types of benefits: 1) a universal or tapered basic income; 2) a tapered subsidized contribution; and 3) a contributory pension. Both the basic income and the subsidized contribution are financed through general revenues and not labor taxes. The proposed system therefore allows for significant reductions in the labor tax-wedge and provides incentives for job creation in the formal sector of the economy. By design, the system is progressive and guarantees coverage to all workers, regardless of activity and work histories.

The rest of the paper is organized in five sections. Section 2 presents a brief overview of existing social insurance and assistance programs in developing countries and the problems they face in terms of coverage, equity, and labor markets efficiency. In Section 3 we explain the theory and main elements of our, generic, integrated social insurance framework. Section 4 develops a formal model to apply this framework to the case of a stylized pension system that can be defined-benefit of defined-contribution. In Section 5 we calibrate the model using consumption data from Philippines and Ghana and simulate the potential impacts of our proposed reforms on the distribution of old-age pensions, payroll contributions, and public

[2] Anti-poverty programs that provide transfers to those who are "already poor," (i.e., workers who were poor prior to the implementation of the program) are not different from health insurance programs that offer health services to those with pre-existing conditions. There is no need to create a separate category of programs to deal with the fact that any social insurance program needs to deal with individuals that were affected by the shock before the start of the program or are affected by the shock at birth.

expenditures. The last section summarizes the main messages from the paper and discusses issues related to implementation.

The end of the social insurance century

At the end of the 19th century, governments began to expand their role in society to include insuring people – workers and their families in particular – against the vicissitudes of life from unemployment to old age. Some countries chose universal health insurance (UHI) while others chose social health insurance (SHI). The vast majority of countries chose mandated contributory pensions for old age, death and disability while only a few chose to rely primarily or exclusively on non-contributory or 'social pensions'[3]. The social insurance model gradually spread throughout the developing world, especially in the post-war period when many African and Asian countries gained independence. By the end of the 20th century, only a handful of countries had eschewed the type of pension scheme first set up in Germany by Otto von Bismarck in 1889.

These schemes had a predictable trajectory. In the early days, they would run significant surpluses even with relatively low contribution rates. As the scheme matured, the number of pensioners grew and, in many cases, benefits were increased. People lived longer but retirement ages did not change. As deficits loomed, contribution rates were increased along with the difference between the cost of labor and take-home pay (the tax wedge). Coverage reflected the size of the informal sector meaning that large numbers of workers could escape the mandate. Eventually, the schemes begin to run deficits. Most countries have pension systems that are somewhere along this life cycle. In 2008, Georgia, became the first pay-as-you-go defined

[3] For example, New Zealand or the countries in Southern Africa.

benefit scheme to come to an end, converted into a non-contributory pension. The twin pressures of demographic aging and informality make it likely that this will be the outcome in more countries in the next few decades.

The urgency of increasing health insurance coverage has led a growing number of countries to move towards a model whereby the contributions for lower income and informal sector workers are paid for by the government. Indonesia pays the full premium for 40 percent of its population and there are many other examples.[4] A few countries, notably Turkey and Vietnam, differentiate the subsidy element depending on where the household falls in the income distribution. The only known case of a fully subsidized pension contribution is found in China, but many countries match voluntary contributions (e.g., India, Thailand). [5] The distinction between contributory and non-contributory is starting to blur.

At the same time, the number of countries with social pensions has increased dramatically in the last 15 years. The shift has been particularly dramatic in Latin America but the trend can be observed in much of Asia including China and there are new cases now emerging in Africa.[6] While there are a handful of universal pensions, most apply some kind of income or pension test which some worry can exacerbate the distortions of the two-tiered labor market even further[7].

Add to these competing pension and health schemes a range of cash and in-kind benefits aimed at the poor and the result is often a complex and typically uncoordinated social protection system. Regardless of the degree of fragmentation, some countries would have to spend more on these programs to have any serious impact while others spend enough to make a real dent in

[4] See Hinz et. al. (2017)
[5] See Cotlear et al (2015).
[6] See Palacios and Knox-Vydmanov (2014).
[7] See Anton et al., (2012)

poverty, if expenditures were more efficient. Moreover, the gaps and discontinuities that create disincentives for people to work and save more can have an important indirect negative impact on the economy as a whole.

As new technologies diffuse through the economy and labor markets undergo structural adjustments, it is likely that the failures of existing systems will become more binding and their social costs will increase. In particular, there are four types of potential changes that existing systems are not prepared to handle: 1) changes in the role of the firm that could reduce the steady-state share of wage employment; 2) higher equilibrium unemployment rates for some groups of workers (including those entering the labor market for the first time); 3) more frequent labor market transitions and movements across sectors and geographic regions; and 4) the persistence of low productivity and subsistence activities as result of reshoring and skills-biased technological change.

Changes in the role of the firm. As new technologies reduce transactions costs and facilitate the enforcement of contracts (e.g., block chains) firms will have incentives to "unbundle" jobs," outsources more tasks to third parties, and therefore reduce (or not increase) the number of wage employees (see Coase 1977; World Bank Group. 2018; McKinsey, 2018). Today, private formal wage employment already represents a modest share of total employment in most middle and low-income countries (around 40 percent in middle income countries and 10 percent in low income countries). The expectation was that as economies developed this share would increase and Bismarckian systems would gradually expand their coverage. But this has not been the case and it is less like to be the case now if, on the contrary, own account work becomes the most prevalent form of work. On the contrary, the high tax-wedge associated with most mandatory social insurance programs today already reduces incentives to create formal

wage employment (see Pages, 2017), and enroll and contribute to mandatory schemes. The implication is that countries need to move away from systems that rely mainly on the agency of the employer to enroll workers and collect/pay contributions and adopt instead a system where the agency is with the worker, even if self-employed, and complementary financing, as needed, comes from the government. For that to happen, the right incentives would need to be in place, including having a clear link between contributions and benefits that eliminates implicit taxes and subsidies.

Higher unemployment. Equilibrium unemployment rates are the product of the probability of losing a job and the duration of unemployment. For workers in certain sectors/occupations and for first time job seekers with certain diplomas/degrees, both the risk of losing a job and/or the time it takes to find a job are likely to increase (Frey and Osborne, 2013). This can be the case even if the same technologies that destroy existing jobs open opportunities to create new jobs. Indeed, the latter are likely to be jobs in different sectors demanding different skills than those existing workers have. For employed workers who are in this situation, traditional severance-pay or unemployment insurance are unlikely to be sufficient to provide income support during the transition (Packard 2019 et al, World Bank Group 2018). New entrants to the labor market are not even eligible for these benefits and yet might need them more than ever. As many have suggested, countries need to consider a broader type of "safety net" that provides income support in all states of nature. These transfers can be allocated to all *individuals* regardless of the level of income (a Universal Basic Transfer, UBI) or be tapered as a function of income (a Tapered Basic Transfer, TBI) (see Majoka and Palacios 2019).

More frequent labor market transitions. Existing insurance and social assistance programs have been designed under the, implicit, assumption that labor markets are "segmented"

and that workers do not move from one job/sector to another very often; they are always formal wage employees or always own account workers in the informal sector. If this was the case, having separate programs for each category of worker would not matter. The reality, however, is that transitions in and out of inactivity/unemployment and between jobs, including between formal and informal jobs, are quite frequent (see Cho et al., 2015 and Ribe et al., 2010). As technological progress increases the rate at which existing jobs are destroyed and new jobs are created, these transitions are likely to become even more prevalent. This calls for integrated social insurance programs that offer continuous protection to workers regardless of where they work and portable benefits that facilitate, instead of constraining, labor mobility, including across geographic regions and sectors. If workers don't lose protection when they switch jobs and if they don't lose savings when they move across regions or countries, they might be more willing to take on risks and new job opportunities (Maloney et al., 2015). For instance, some may move from low pay formal wage employment to higher pay own account work or entrepreneurship.

Just relying on non-contributory programs might not always be a sustainable solution. First, these programs do not offer the same level of protection. And if they did, then there would be strong incentives to avoid contributions to mandatory schemes. The non-contributory programs would effectively become a tax on formal jobs (see Levy 2010; and Ribe et al., 2010).

Persistence in the share of low-productivity and /subsistence activities. At least during a transition period, technological progress can accentuate poverty and income inequality. New production technologies, for instance, can encourage *reshoring* and reduce investments in low income countries that in the past were fueled by low labor costs. This would imply fewer opportunities to move out of subsistence agriculture into higher productivity jobs in manufacture or services (see Christiaensen et al., 2019). New technologies are also likely to continue to

expand income gaps between workers with high technical and non-cognitive skills who are able to benefit from new, high-productivity, digital jobs, and unskilled workers who continue to operate in traditional, informal, sectors in small, low-productivity, enterprises (Autor, 2003).

This implies that countries need to improve the efficiency and equity of existing redistributive arrangements. The complexity of current systems and the multiple sources of taxes and subsidies make it difficult to understand their net redistributive impacts. There is increasing concern about exclusion errors (Ravallion et al., 2018) and evidence that the lack of coordination between multiple social protection programs can lead to the duplication of benefits for some (e.g., social pensions and conditional cash-transfers) while others fall through the cracks (Ribe et al., 2012). Meanwhile, contributory pensions and health insurance systems where contributions are not linked to benefits can be regressive (Lindert et al., 2004; Forteza et al., 2015). Countries could consider instead an integrated system of subsidies that are allocated not at the program or household level but at the individual level (possibly based on means) and which are financed through general revenues.

A Simple Fix

There are well known failures in insurance and capital markets that will continue to call for publicly sponsored social insurance programs: myopia, moral hazard, adverse selection and credit/liquidity constraints. Standard interventions are mandatory *savings* or *risk-pooling* arrangements to smooth consumption, and *redistributive* arrangements to cover those who cannot afford to save enough or pay premiums and deal with correlated (uninsurable) risks (World Bank (1995), Barr, 2009; Holzmann et al., 2007; Ribe et al., 2010; Packard 2019). Yet in principle, there is no need to have separate social assistance and social insurance programs, and/or multiple

forms of redistributive arrangements. Instead, the objective would be to clearly separate the *insurance* and *redistributive* functions of the system and finance each in the most efficient manner.

Our proposal therefore, is to design social insurance programs based on savings and/or actuarially-fair risk pooling, to which are appended *explicit* redistributive arrangements to guarantee: 1) a minimum level of income (consumption); and 2) to subsidize premiums/savings for those who cannot afford them. The redistributive part of the system therefore would have two elements: a basic income transfer that can be in the form of universal basic income (UBI) or tapered (TBI) and subsidized insurance that could either be in the form of universal social insurance (as it was first called by Anton et al., (2012) or tapered (TSI). The UBI/TBI component is critical to ensure that all workers, regardless of level activity and type of work, are always able to support a minimum level of consumption. Subsidized insurance is necessary to ensure that everyone is covered against core risks regardless of the type employment and sector of work. Wage employees, informal own account workers, and farmers would all have access to the same system according to the same rules. Both the basic income and the subsidies for insurance programs would be allocated based on means and not based on the type of work that individuals perform. This is not only more equitable and transparent, it should also reduce labor market distortions by eliminating implicit taxes/subsidies on different types of jobs and facilitating labor mobility. Those losing their jobs or moving from wage employment to self-employment would remain covered in the same system. Only the source of funding of the social insurance programs and the proportion covered by the basic income would change.

In terms of financing mechanisms, the proposal is to finance redistributive arrangements (both the UBI/TBI and TSI) through general revenues and not taxes on labor. This is important

to reduce the tax-wedge and improve incentives for the creation of formal jobs (see Pages, 2017). This doesn't imply eliminating social security contributions; workers, and their employers when available, can continue to make payments to finance pensions, health insurance, and unemployment benefits. These payments, however, would on average be equal to the expected costs of the benefits offered. In essence, the proposed reform would eliminate *implici*t redistributive arrangements within social insurance programs (see Ribe et al., 2012). Risk pooling programs remain critical, but they would become actuarially fair. In principle[8], all *ex-ante or built-in* redistribution, the kind that takes place independently of the random realization of different shocks, would be integrated in the UBI/TBI and TSI parts of the system.

In the case of a health insurance program, for instance, workers (and their employers) would pay a premium that is related to the expected cost of the health package that covers them and their families. This premium might still allow for a certain level of *implicit* redistribution (e.g., between men and women, old and young, and between healthy workers and those with pre-existing conditions) but it would be "accounted for." Individuals who cannot afford the premium would receive government subsidies. The poor, for instance, might be subsidized fully while those in the middle of the income distribution might receive partial subsidies.

For pensions there would also be an integrated system (no multiple contributory funds, with multiple "pillars," and a social pension scheme) where all workers (and their employers) make contributions to replace a certain level of income. These contributions would be equal in all cases, whether a defined-benefit or a defined contribution formula, to the present value of expected pensions. For those individuals who cannot save enough, the pension system would also include a TSI that, as in the case of health, subsidizes all or part of the necessary

[8] In practice, questions will arise as to the level of pooling given certain predictable differences such as, for example, the life expectancy of men and women for purposes of calculating the actuarially fair price of an annuity.

contributions up to a limit. For instance, for the extreme poor, there could be a 100 percent subsidy while for those in the third quantile the subsidy drops to 20 percent of the total contribution needed, up to a maximum number of years of contributions.[9] This arrangement would not only increase earnings during old-age and prevent poverty but also provide incentives for long-term savings (Hinz et al., 2005; Ariely et al., 2015).

The same principles would apply to unemployment benefits. As discussed elsewhere, like in the case of pensions, the most efficient way to design unemployment benefits is through savings with explicit redistribution (see Robalino and Weber, 2014; and Margolis and Robalino 2012). This would involve having a standard unemployment insurance system where the equilibrium contribution rate depends on the average risk of unemployment and its duration. Given a target replacement rate, workers contribute a given share of their earnings to the system. The contributions are equal to the expected value of benefits. But the government would track credits and debits in individuals accounts. For workers who cannot save enough to replace a given level of income given their risk profile, a TSI element can also subsidize contributions up to a limit. This type of scheme not only provides protection against the loss of income, it also reduces moral hazard since the savings belong to workers and, if not used when unemployed, they can accumulate and be used to fund investments or higher pensions during old-age.[10]

In terms of the basic income scheme, there are tradeoffs between a universal benefit and one that is tapered (see Gentilini et al., 2019; and Majoka and Palacios, 2019). Universal programs properly implemented can eliminate exclusion errors that may occur in means-tested programs (Ravallion, 2018), and reduce administrative costs since the only information required is the identity of the individual (assuming a truly universal benefit, not one dependent on age).

[9] The need for a maximum number of contributions is discussed in the next section.
[10] See Robalino and Weber, (2016).

On the other hand, given a fiscal envelope, a universal program will provide the poor with lower benefits than with tapering, assuming that it is well targeted (see Rigolini, 2014 and Olken 2018 et al., for Indonesia) particularly when there is a narrow income-tax base so that a progressive tax system is not able to 'claw back' most of the benefits going to higher income individuals. As illustrated by Majoka and Palacios (2019), simulations for a broad set of low and middle income countries, show that in most cases, tapered programs are likely to reduce poverty significantly more than a universal benefit with the same budget. Increasing the amount being spent relative to most safety net programs allows for fewer exclusion errors since the taper only begins to apply in the middle of the income distribution and is more gradually applied than traditional programs with discrete cutoff points. As discussed below, this approach is becoming more feasible in light of new technologies and the massive increase in the data available on individuals and households.

Modeling the Proposed Reform in the Case of Pensions

In this section we develop a simple model to assess the impact of a reform that integrates risk-pooling for poverty-prevention, with transfers (implicit or explicit) within mandatory old-age pension systems. The focus is on the impact of these reforms on: (1) the distribution of benefits by income level and source (i.e., benefits related to individual contributions, transfers within the pension system, and transfers outside the pension system); (2) equilibrium contribution rates within the mandatory pension system; and (3) fiscal costs, expressed as a share of total GDP and aggregate consumption.

We start by modeling the pension system which can be either defined-contribution (DC) or defined-benefit (DB). In the case of DB plans, we separate the portion of the old-age pension

that results from individual contributions from the portion that is financed through implicit or explicit subsidies. In this sense, the DB pension plan is "actuarially fair": individual contributions are linked to expected pension benefits. Benefits not covered by individual contributions are financed by labor taxes and/or general revenues.

We assume that the level of the pension is defined by policy to replace a share ψ of average life-time earnings for full-career individuals; those who have contributed continuously between the enrollment (e) and retirement age (R). Individuals who contribute less, receive proportionally less. For instance, the mandate of the pension system can be to replace 40% of average life-time earnings at age 65 for individuals who have contributed for 40 years. The target replacement rate for somebody who has contributed half of the time would be only 20%. Given this target replacement rate we define a benefit accrual rate, α, which gives the share of average life-time earnings that is replaced for each year of contribution. We have:

$$\alpha = \frac{\psi}{(R-e)}, (1)$$

The level of the pension then is given by:

$$P(R) = \alpha(R-e)\sum_{a=e}^{R}\frac{D(a)\omega(a)(1+r)^{R-a}}{(R-e)} = \alpha\sum_{a=e}^{R}D(a)\omega(a)(1+r)^{R-a}, (2)$$

where $D(a)$ is equal to one if the individual contributed to the system at age a (zero otherwise), $\omega(a)$ is the salary at age a, and r is the rate at which salaries are revalorized in DB schemes (or the rate of return on contributions in the case of DC schemes). As shown in the Appendix, the equilibrium contribution of the pension which equates the present value of pensions paid with the present value of contributions is given by:

$$\beta = \alpha G, (3)$$

where G is the so-called annuity factor or "G factor," essentially discounted life expectancy at retirement.

Identity (3) indicates that the level of the equilibrium contribution rate increases when the accrual rate (the level of benefits) increases and/or when life-expectancy at retirement increases.

Assuming the growth rate, g, of earnings $\omega(a)$ is also equal to the rate of return on contributions (r) equation (2) can be further simplified to:

$$P(R) = \alpha \sum_{a=e}^{R} D(a)\omega(e)(1+g)^{a-e}(1+r)^{R-a} = \alpha(R-e)d\omega(R), (4)$$

Thus, the pension can be defined as a function of the accrual rate, the contribution period ($R-e$,) the contribution density d (i.e., the share of time the individual contributed to the system), and earnings at retirement.

So far, we have described the "contributory" portion of a pension plan which is actuarially fair. Often however, pension plans offer benefits which are above those financed solely by individual contributions. This is usually done through a minimum pension guarantee $P_{\min}$.[11] The effective pension that individuals ultimately receive, therefore, depends on their earnings. For individuals in income quantile i this pension is given by:

$$P(i) = \max[P_{\min}, \alpha(R-e)d(i)\omega(i)], (5)$$

All individuals who benefit from the minimum pension will receive replacement rates which are above ψ. This is simply because, by definition, the minimum pension would be higher

[11] It also occurs in systems with non-linear accrual rates where the early contribution years may be credited at a higher value than later years. These systems encourage short contribution periods to achieve the best ratio of benefits to contributions. Both minimum pensions and high accrual rates for the first years of contribution are often meant to redistribute to low income workers.

than the pension that guarantees a replacement rate ψ. For these individuals, the equilibrium contribution rate is equal to: [12]

$$\beta(i) = \alpha(i)G, (6)$$

where $\alpha(i) = \frac{P_{\min}}{\omega(i)d(i)(R-e)} > \alpha$

Essentially, individuals who benefit from the minimum pension would need to pay a higher contribution rate given that they are receiving, implicitly, a higher accrual rate $\alpha(i)$. We note that the value of the accrual rate (and therefore the contribution rate) would increase when the minimum pension increases or when the salary of the individuals and/or the contribution density decrease.

We model the "social assistance"/anti-poverty program through a public risk-pooling mechanism that takes the form of a universal basic income (UBI) or tapered basic income (TBI). In its general form the transfer for an individual in income quantile i is given by:

$$T(i) = uc - \varepsilon\omega(i), (7)$$

When the parameter ε is equal to zero, the transfer takes the form of a UBI that is expressed as a share u of consumption per capita (c). When $\varepsilon > 0$ the transfer is "tapered" and the UBI becomes a TBI; it is reduced as a function of the level of income of the individual.

To simulate the integration of the anti-poverty program and the pensions plan, we assume that the level of benefits received by a given individual, regardless of its position in the income distribution, does not change. Since there is a new transfer, however, the level of the pension

[12] Here, for tractability, the implicit assumption is that all workers have the same mortality rates regardless of income levels. Although difficult in practice given data constraints, one could calculate effective accrual rates by income groups taking into consideration that for low income workers mortality rates could be higher (and therefore equilibrium contributions rates lower).

within each quantile can be reduced proportionally. The pension for an individual in quintile i is therefore given by:

$$P(i)^T = \max[P_{\min}, \alpha(R-e)d(i)\omega(R)] - T(i), (8)$$

This implies that both the new annuity factor and equilibrium contribution rates can be reduced within each quantile:

$$\alpha(i)^T = \frac{P(i)^T}{\omega(i)d(i)(R-e)} < \alpha(i), (9)$$

$$\beta(i)^T = \alpha(i)^T G < \beta(i) \ , (10)$$

We can then compute the cost of the transfer $C(T)$ and the cost of the new subsidize pension $C(P)$ as a share of gross domestic product:

$$C(T) = \frac{\sum_{i=1}^{I} T(i)q(i)l(i)}{y}, (11)$$

$$C(P) = \frac{\sum_{i=1}^{I} (\beta(i)^T - \beta'(i))w(i)q(i)l(i)}{y}, (12)$$

where $\beta'(i)$ is the contribution rate of individuals in quantile i, assumed to be set by policy (likely small in the lowest income quintiles and equal to $\beta(i)^T$, the equilibrium contribution rate post-transfer, in the other quantiles); $q(i)$ is the share of the population in income quantile $q(i)$, $l(i)$ is the share of this population that is enrolled in the pension system, and y is GDP per capita (in equations 11 and 12 multiplying the numerators and denominators by the total population would give total costs and total GDP).

Equations (11) and (12) define the essence of the "post-integration" system. The redistributive component of the pension system has two elements which are financed out of general revenues: the basic income transfer (UBI or TBI), and the subsidized contribution,

which can also be universal (USI) or tapered (TSI) depending on the values of $\beta'(i)$. The two types of transfers are interrelated. If the basic income transfer increases, then the subsidized contribution can decrease. Once both are set, by policy, there are no negative incentives for workers to "game" the system. If workers don't contribute to the pension system, they receive the basic income. If they contribute, they can receive in addition a subsidized contribution which is equal to $\beta(i)^T - \beta'(i)$ up to a maximum number of years of contributions given by $(R-e)d(i)$. This is the number of years of expected contributions for workers in the income quantile needed to reach the targeted replacement rate. Additional contributions increase the contributory pension but not the subsidized pension. If individuals contribute less than $(R-e)d(i)$ years, the value of the subsidized pension would also be lower. For workers who are fully subsidized ($\beta'(i) = 0$), we assume that the government funds the value of the subsidized pension over $(R-e)$ years, paying $\beta(i)^T$ during $(R-e)$ years instead of $d(i)(R-e)$ years.

In the simulations presented in the next section we focus on the distribution of consumption given the consumption smoothing objective of the pension system. We express earnings $\omega(i)$ as a share of average consumption. We have:

$$\omega(i) = s(i)c, (13)$$

The cost equations, therefore, can be written as:

$$C(T) = \sum_{i=1}^{I} (u - \varepsilon s(i))q(i)l(i)\theta\,, (14)$$

$$C(P) = \sum_{i=1}^{I} (\beta(i)^T - \beta'(i))s(i)q(i)l(i)\theta\,, (15)$$

where θ is the ratio of consumption per capita to income per capita or the consumption propensity of households.

We also keep track and report the equilibrium contribution rate of the pre-reform system with *implicit* redistribution (β^*), the equilibrium contribution rate of the post-integration system with *implicit*, redistribution (β^R), and the equilibrium contribution rate of the post-integration system without redistribution (β^N). The first two are contribution rates that would need to be set if the minimum pension had to be funded only through the contributions of plan members (essentially a tax on labor). The latter is the, average, contribution rate that would be set if the subsidized pension is financed through general revenues. We have:

$$\beta^* = \sum_{i=1}^{I} \beta(i) \quad q(i)l(i)\,, (16)$$

$$\beta^R = \sum_{i=1}^{I} \beta(i)^T q(i)l(i)\,, (17)$$

$$\beta^N = \sum_{i=1}^{I} \beta'(i) \quad q(i)l(i), (18)$$

Because of the UBI/TBI, equilibrium contribution rates in the post-integration systems, both with implicit and without redistribution, are smaller. In addition, the equilibrium contribution rate without redistribution is the smallest. We have:

$$\beta^N < \beta^R < \beta^*, (19)$$

Results

In the simulations presented in this section we work with one low and one middle-income country. For the low income country we use consumption distribution data, labor force participation rates, and consumption/GDP per capita ratios for Ghana, and for the middle-income country those of the Philippines. We further assume that contribution densities – the proportion

of the working years that contributions are made – are an increasing function of earnings and that they are lower in low-income countries given a larger prevalence of informal work. For the middle-income country, contribution densities by decile are set to {0.5,0.5,0.6,0.7,0.8,0.9,1,1,1,1}. For the low-income country, we assume that the contribution densities are reduced by 30%. For simplicity, we fix the enrollment age and retirement age at e=25 and R=65, respectively, and the G factor at 15. We consider two levels of generosity of the pension system. A "generous" system { ψ=0.70 and $P_{\min}$=0.25} and a "conservative" system { ψ=0.40 and $P_{\min}$=0.15}. For the anti-poverty program, we consider two levels for the basic transfer { u=0.10,0.05} and two levels for the taper {ε=0,0.10}. We also set the maximum contribution rates $\beta'(i)$ for the first four deciles at {0,0.05,0.10,0.15}. For the other deciles the contribution rates are always equal to the equilibrium contribution rates post transfer: $\beta'(i) = \beta(i)^T$. The data and parameters are summarized in Table 1.

Table 1: Model Parameters and Consumption Data

Country	Deciles	Per Capita Consumption		Average Per Capita Consumption	s(i)	Tetha	Labor Force Participation	Contribution Density
PHILIPPINES	1	3,751		23,482	0.160	0.74	0.346	*0.5*
	2	5,886			0.251		0.409	*0.5*
	3	7,735			0.329		0.447	*0.6*
	4	9,825			0.418		0.474	*0.7*
	5	12,337			0.525		0.514	*0.8*
	6	15,563			0.663		0.541	*0.9*
	7	19,822			0.844		0.568	*1*
	8	26,534			1.130		0.591	*1*
	9	38,984			1.660		0.617	*1*
	10	94,391			4.020		0.670	*1*
GHANA	1	91		6,231	0.190	0.7	0.464	*0.35*
	2	160			0.334		0.478	*0.35*
	3	210			0.439		0.482	*0.42*
	4	263			0.550		0.510	*0.49*
	5	319			0.667		0.510	*0.56*
	6	381			0.796		0.534	*0.63*
	7	462			0.967		0.554	*0.7*
	8	573			1.200		0.596	*0.7*
	9	760			1.589		0.637	*0.7*
	10	1,563			3.269		0.756	*0.7*
PARAMETERS								
UBI (% C per capita)	*5%*	*10%*						
Slope	*0*	*0.1*						
MinPension (% C per capita)	*15%*	*25%*						
Target replacement rate	*0.4*	*0.7*						
(R-e)	*40*							
G factor	*15*							
DECILE	**1st**	**2nd**	**3rd**	**4th**	**5th**			
Max Contribution Rate	*0*	*0.05*	*0.1*	*0.15*	*99*			

Note: Numbers in italics are assumptions

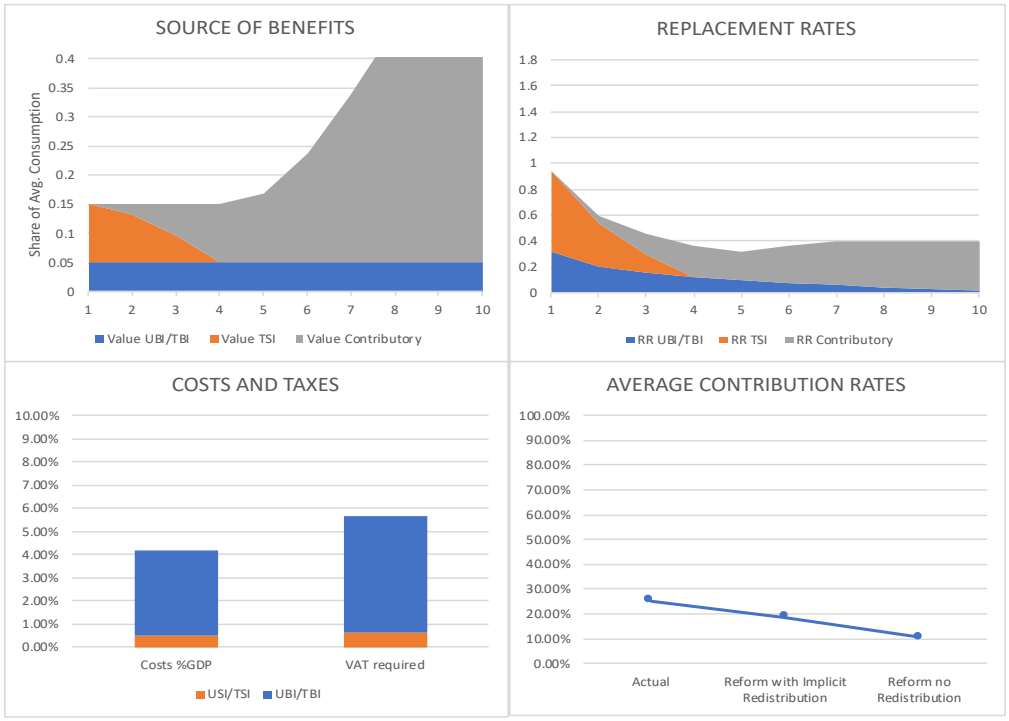
For every simulation we report: 1) the value of total income received at retirement from the integrated pension systems by income decile and source (UBI/TBI, subsidized pension, and contributory pension); 2) the level of income replaced from each source by decile; 3) the cost as a share of GDP of the UBI/TBI and the subsidized pension, as well as the level of the consumption tax that would be required to finance these costs; and 4) the level of the three equilibrium contribution rates defined above (pre-reform, reform with implicit redistribution, and reform with no redistribution).

Our first simulations refer to the pension system with the more modest mandate (40% replacement rate and a minimum pension equivalent to 15% of average consumption), integrated with a UBI offering a benefit of 5% of average consumption (see Figure 1). The results show

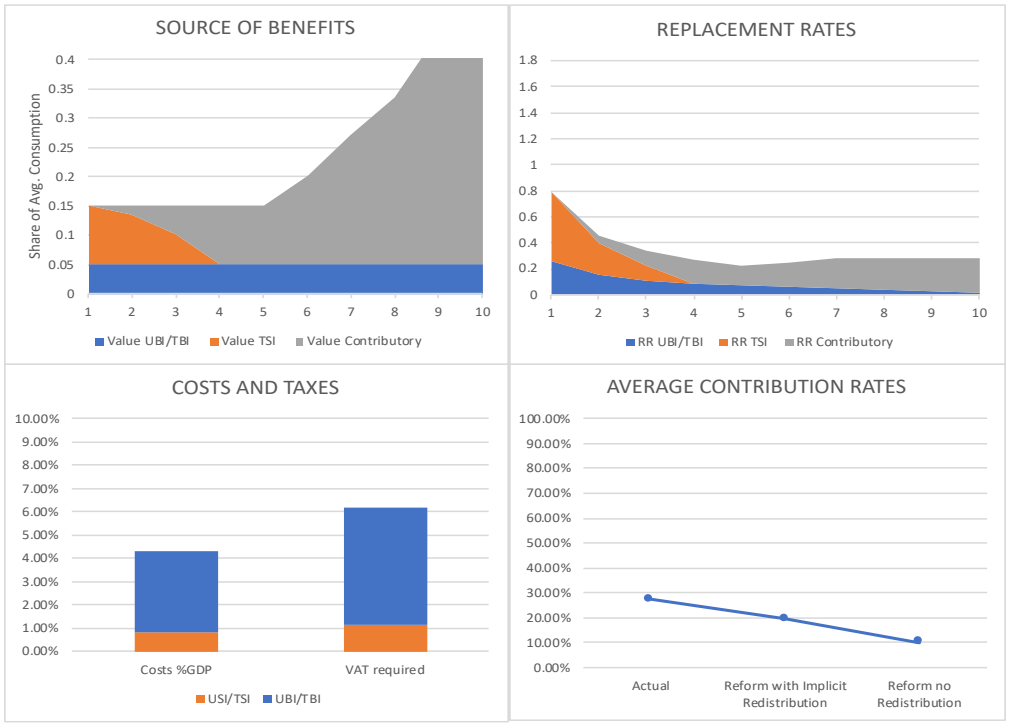
that both the subsidized pension and the basic income would be the main source of benefits in the first 3 to 4 deciles of the income distributions. The share of these benefits in total income would go from 100% for the first quantile in both countries, to 47% for the fourth quantile in the low-income country and 33% in the middle-income country. The difference is mainly due to differences in contribution densities. Financing the two redistributive components would cost slightly more in the case of the low-income country; 4.8% of GDP vs. 4.2%. The cost of the basic transfer is marginally higher (4% of GDP vs. 3.7%) given that the benefit is defined as a share of average consumption and that the consumption/GDP ratio is higher in the low-income country. The cost of the subsidized pension is also higher (0.8% of GDP vs. 0.5%) because implicit accrual rates and equilibrium contribution rates are higher due to lower contribution densities. In both countries the programs could be funded by a consumption tax of around 6 percent, 5 percentage points allocated to finance the basic income component. The integration of the two programs allows for a significant reduction in contribution rates in both low and high-income countries, from 31.7 percent and 25.3 percent respectively, to 10.5 percent. Again, the equilibrium contribution rate of the pre-reformed system is higher in the case of the low-income country as a result of lower contribution densities. In the reformed system, the equilibrium contribution rate is very similar given that there is no redistribution and therefore target replacement rates, annuity factors, and the contribution rates are close, particularly in the highest deciles.

Figure 1: Modest pension system (40% replacement and 15% minimum) with 5% UBI

MIDDLE INCOME COUNTRY



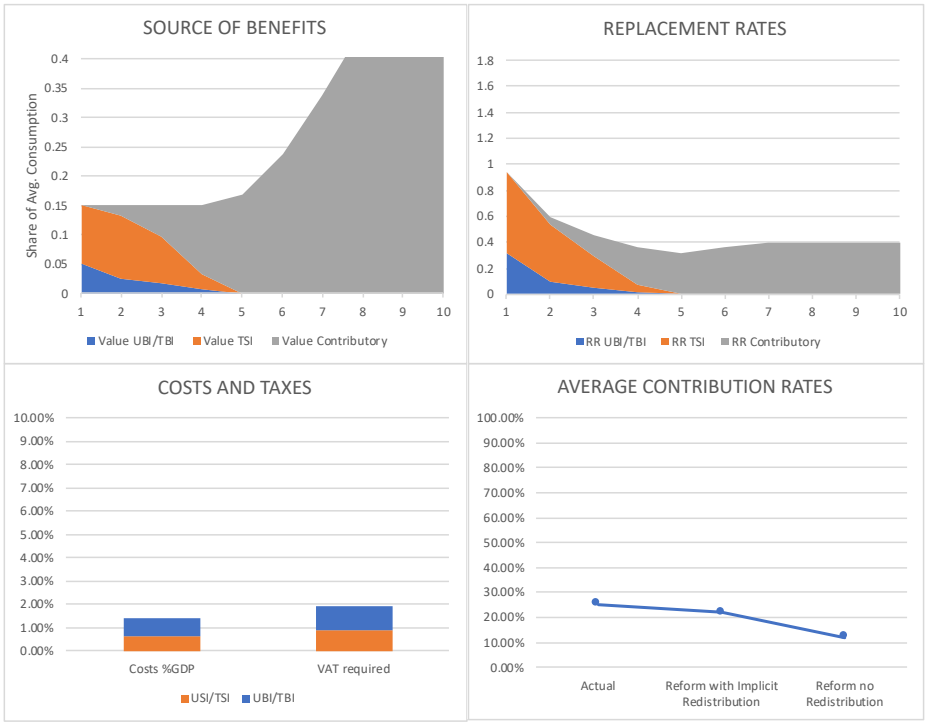
LOW INCOME COUNTRY



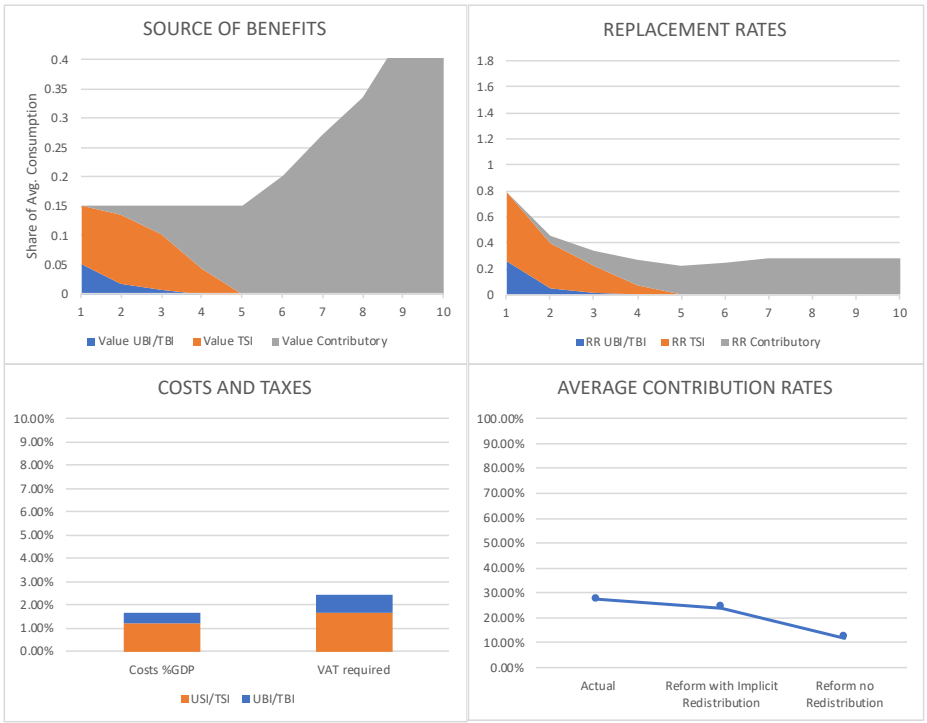
Introducing a 10 percent taper on the basic income would limit its role to the first two deciles of the income distribution (see Figure 2). This implies that the level of the basic pension would need to higher. But because high income individuals no longer receive a basic income, the cost of the integrated system would be reduced substantially, from 4.2 percent of GDP to 1.4 percent in the middle-income country and from 4.8 percent to 1.7 percent in the low-income country. In both countries, the cost of the basic income would fall to one percent of GDP. The consumption tax needed to finance the system would drop to 1.9 percent and 2.3 percent respectively.

Figure 2: Modest pension system (40% replacement and 15% minimum) with 5% TBI

MIDDLE INCOME COUNTRY



LOW INCOME COUNTRY



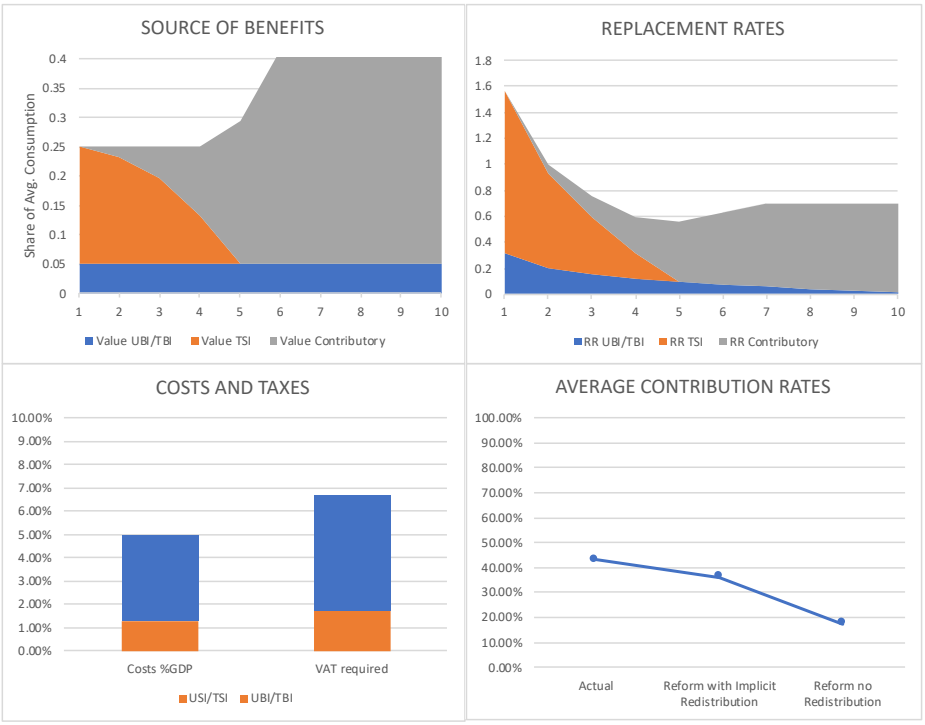
Pension systems, however, often have more generous mandates. With a target replacement rate of 70 percent and a minimum pension of 25 percent of average consumption, equilibrium contributions in the pre-reform system would be considerably higher; 43 percent in the case of the middle-income country and 53 percent for the low-income countries (see Figure 3).[13] Thus, financing large pension mandates through individual contributions and labor taxes can be an important barrier to the creation of formal jobs. Under the integrated system, the level of the equilibrium contribution rates could be reduced to 10.5 percent in the middle-income country and 17.5 in the low-income country. However, the cost of the redistributive components would be much higher. The cost of the UBI would be the same as before, but the cost of the subsidized pension would now increase to 1.3 percent of GDP in the middle-income country and 1.9 percent in the low-income country, requiring consumption taxes of 1.7 and 2.3 percent respectively. Total fiscal expenditures to fund the basic income and the subsidized pension would be considerable requiring a consumption of tax of 6.7 percent and 7 percent respectively.

Introducing a "taper" on the basic income, however, can reduce costs substantially even if the basic income for the poor increases. For instance, integrating the pension system with a program that offers a basic income of 10 percent of average consumption with a taper of 10 percent would reduce the cost of funding the basic income to 3 and 3.4 percent respectively and the cost of the subsidized pension to 1 and 1.6 percent (see Figure 4). The consumption tax required would drop to 5.4 and 6 percent respectively. At the same time, the average contribution rate to the pension system would be more than halved, dropping to 18 percent.

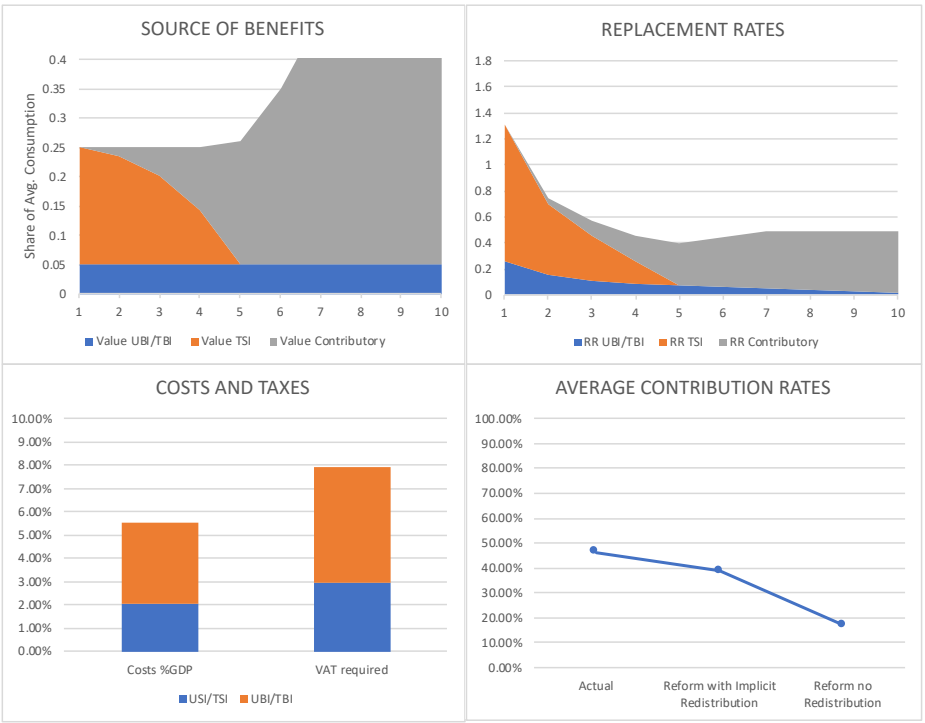
[13] These contribution rates seem high compared to observed contribution rates across countries, but this is because in many cases actual contributions rates are too low relative to the level of benefits.

Figure 3 Generous pension system (70% replacement and 25% minimum) with 5% UBI

MIDDLE INCOME COUNTRY



LOW INCOME COUNTRY



Conclusions

In this paper we have proposed a policy framework to integrate the insurance function (actuarially fair risk-pooling or savings) of the social protection system with the redistributive function (transfers) in order to expand coverage, improve equity and reduce labor market distortions. We argue that this type of integration is becoming more important given a future world of labor that might be characterized by: a lower share of formal wage employment (where mandatory contributions work); the persistence of low productivity and subsistence jobs; more frequent labor market transitions including across sectors and geographic regions; and higher equilibrium unemployment rates for some groups of workers.

We illustrated the reform proposal with the case of old-age pensions. The integrated system that we designed pays benefits from three sources: 1) a universal or tapered basic income (UBI/TBI); 2) a tapered contribution subsidy (TSI); and 3) a contributory pension. The two redistributive components of the pension system (UBI/TBI, TSI) are financed out of general revenues. The cost of the TSI, depends on the level of the contribution rates set for each income quantile.

The two types of transfers are interrelated. If the basic income transfer increases, then the subsidized contribution can decrease. Once both are set, by policy, there are no negative incentives for workers to "game" the system. If workers don't contribute to the pension system, they receive the basic income. If they contribute, they can receive in addition a subsidized contribution up to a maximum number of years of contributions. This is the number of years of expected contributions for workers in the income quantile need to reach the targeted replacement rate. Additional contributions increase the contributory pension but not the subsidized pension.

By design, the system that we propose covers the entire labor force, is progressive, and eliminates the tension between social pensions and anti-poverty household transfers. Simulations with a stylized model using consumption data for the Philippines and Ghana show that, depending on the generosity of benefits, the system could be financed by a consumption tax ranging between 3 and 6 percent, while allowing significant reductions in the labor tax-wedge.[14] This is expected to provide incentives to create formal jobs and contribute to the pension system and could indirectly increase productivity.

A key underlying assumption is that it is possible to implement the explicit redistributive elements of the system. However, many countries are not in a position today to be able to identify 100 percent of their citizens much less to ensure that each receives a cash transfer or contribution subsidy. Nonetheless, this is changing as countries are rolling out a digital ID infrastructure that will make it possible to be confident that just about everyone is covered, as for example, was achieved in Iran with its cash transfer program in 2010. In India, 500 million bank accounts are now linked to their unique ID number so that the government can seriously consider these policy options knowing that there will be no ghosts or duplicates among its UBI recipients. At the same time, the rapid rise of digital payments and mobile money will reduce the transaction costs of contributing to the system, especially for the self-employed.

The challenge of implementing a tapered benefit is even greater in light of the need to rank individuals and/or households according to their needs. Nevertheless, this has been achieved in middle income countries such as Chile and Turkey which have been able to harness administrative data in a way not possible twenty years ago. At the same time, countries like

[14] Although beyond the scope of this paper, other studies have highlighted the progressivity of channeling consumption tax revenues to universal or quasi-universal cash transfer programs. See Harris et al. (2018) and Majoka and Palacios (2019).

Pakistan and Rwanda have been able to effectively collect data and rank the vast majority of the population for a small fraction of the total outlays of their cash transfer programs.

It is also important to remember the interplay between the amount of redistribution and the implementation of these programs. By increasing this type of spending significantly, the kind of exclusion errors that are sometimes observed in low income countries – where there is often little to differentiate those in the second from the third decile of the income distribution – should be significantly reduced. At the same time, the administrative costs will fall as a fraction of spending given that the infrastructure required is not very different.

The global COVID-19 pandemic, which started as this paper was being reviewed, has exposed the weaknesses of social protection policies and delivery systems around the world. Governments in dozens of countries are hurriedly searching for the informal sector workers that fall between the cracks of the current regimes. The rationale for the paradigm shift described in this paper has never been stronger.

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TECHNICAL APPENDIX

The identity ensuring the financial sustainability of the pension system, whether DB or DC, is given by:

$$\beta \sum_{a=e}^{R} \omega(a)\,(1+r)^{R-a} = \sum_{a=R}^{L} \frac{P(R)S(R,a)}{(1+r)^{a-R}}, (1)$$

where $\omega(a)$ is the covered wage at age a, e is the age of enrollment in the pension system, R is the retirement age, β is the contributions rate, r is the sustainable rate of return of the pension system,[15] L is the maximum life expectancy of homo-sapiens, $P(R)$ is the pension received at age R, $S(R,a)$ is the probability, at age R, of surviving to age a.

Essentially, the *expected* present value of pension benefits (the right-hand side of the equation), has to be equal, at the age of retirement, to the value of accumulated contributions plus interests (the left-hand side). If for a given individual, including in the case of DB systems, the identity does not hold, the pension system is either accumulating assets or liabilities.

By inserting identity (3) from the main text into (1) we can derive the equilibrium contribution rate of the pension plan:

$$\beta = \alpha G$$

where G is the, so called, G factor, essentially "discounted" life expectancy at retirement:

$$G = \sum_{a=R}^{L} \frac{S(R,a)}{(1+r)^{a-R}}$$

[15] In a fully-funded DC scheme r is equal to the rate of return of the portfolio of investments in financial assets of the pension funds. In a pay-as-you go system r is the weighted average of the rate of return on financial assets and pay-as-you-go assets.