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IZA DP No. 17886

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John Giles
World Bank and IZA

Clément Joubert
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Tomoaki Tanaka
Queen Mary University of London, JICA and the University of Tokyo

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IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Participation in Pension Programs in Low and Middle Income Countries

Low- and middle-income countries are aging rapidly but stagnation of growth in participation in pension programs, due to widespread informal employment, presents a major fiscal challenge. Some claim that improving the design of pension program rules can encourage more pension contributions, while others push for universal non-contributory pensions. This paper reviews the recent academic literature on the determinants of active participation in pension systems in high-informality settings. An emerging body of evidence shows that participation responds significantly to financial incentives as well as nonfinancial obstacles. At the same time, pensions are imperfect substitutes for other strategies to cover longevity risk, including support through the family, which will remain crucial for many older people in fiscally constrained environments. Therefore, policy makers should integrate the design of contributory pensions, social pensions, and policies that facilitate other forms of elderly support, and consider how all three interact. To inform such efforts, these interactions must be more systematically investigated and the empirical evidence must be expanded beyond a small number of middle-income countries.

JEL Classification: H55, G51
Keywords: pensions, retirement, savings, informality, LMICs

Corresponding author:
Clément Joubert
Development Economics Research Group
Mail Stop MC3-311
The World Bank
1818 H Street NW
Washington, DC 20433
E-mail: cjoubert@worldbank.org

1 Introduction

Concerns abound that low- and middle-income countries (LMICs) are becoming "old before they are rich."[1] People born in these countries in 2000 will witness a sharp increase in the old age dependency ratio[2] from 8% to 30% by age 70.[3] The decline in multi-generation households, coupled with widespread financial exclusion (Allen et al., 2016) and low financial literacy (Klapper and Lusardi, 2020) highlights the need for pension programs to facilitate retirement and well-being at older ages. Countries must develop formal mechanisms to cope before the old-age dependency ratios rise sharply.

Since the turn of the millennium, encouraged by robust growth rates and rising aspirations for universal social protection,[4] many LMICs have rapidly expanded social (aka "non-contributory") pension programs (Holzmann et al., eds, 2009, Rofman et al., 2015). These schemes, financed through general tax revenue, grant pension benefits to the elderly who have made few contributions to a government-sponsored scheme. They have sharply reduced the number of elderly people without a pension,[5] but benefit levels are often low due to fiscal constraints (Bloom and McKinnon, 2014). At the same time, growth in the proportion of workers contributing to social security schemes has stagnated due to widespread unregistered, or "informal", work. Figure 1 shows the large gap that now exists between pension coverage defined in terms of beneficiaries versus coverage in terms of contributors. With a growing elderly population, social pension benefits will need to reduce either their coverage or the level of benefits provided, lest they become fiscally unsustainable.

A central question arises as to whether participation in contributory schemes can be

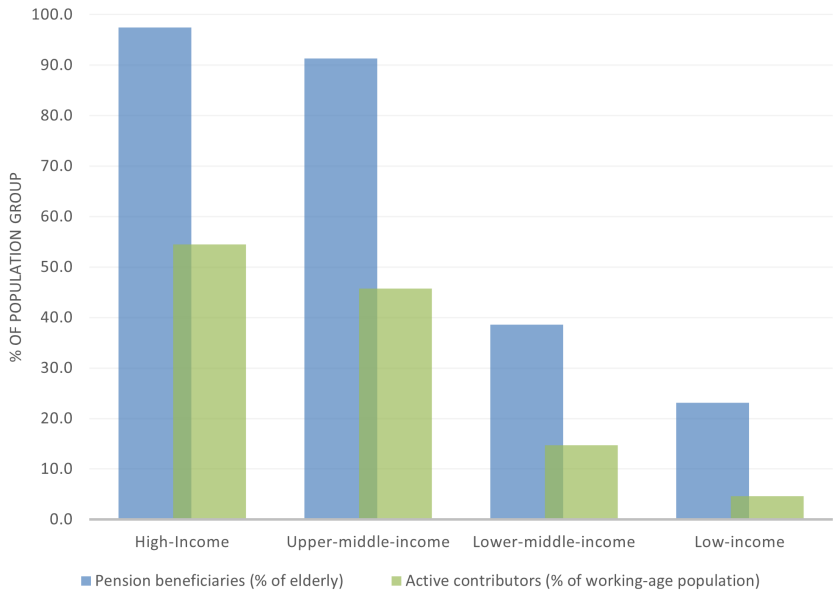
[1] For example: The Economist, December 2023 issue.

[2] Old-age dependents (65+) per 100 persons ages 15-64.

[3] See projections for less developed regions in the World population prospects, 2024 revision.

[4] For example, in 2016, the World Bank and the International Labour Organization jointly initiated the Global Partnership for Universal Social Protection to Achieve the Sustainable Development Goals (USP2030).

[5] World Social Protection Report 2020-22, figure 4.37.



Source: World Social Protection Report 2022

Figure 1: The gap between pension beneficiaries and pension contributors

increased to alleviate the looming fiscal burden. Demographers note that in many LMICs, declining fertility frees up household disposable income (Mason and Lee, 2006), but these resources are not being channeled into pension programs. As LMICs have a limited capacity to enforce labor regulation (Almeida and Carneiro, 2012), pension program participation is always *de facto* voluntary, regardless of *de jure* obligations.[6] The design and implementation of pension systems could thus be crucial for promoting or hindering participation. For example, generous social pensions could, in theory, "cannibalize" contributory pension programs when workers are able to evade contributions and still obtain benefits (Levy and Schady, 2013).

The willingness to contribute to formal pension programs depends on the other means of support available to households. Section 2 considers how these alternative strategies have evolved with economic development and in response to the introduction of formal pension programs. Where older people were traditionally supported informally through multi-generation living arrangements, migration and preferences for privacy have led to

[6]Some countries mandate that all workers contribute to social security, while others exclude the self-employed or employees in small firms from this obligation.

an increasing use of inter-vivos transfers and long-term savings for managing consumption smoothing over the life-cycle. A first section (section 2.1) documents the roles played by transfers from family members (or within a community or clan) to assist older people, noting that declines in family size also reduce the potential scope for insurance through financial transfers. Next, section 2.2 reviews recent research considering the impacts of pensions on traditional forms of support within the family, through living arrangements and informal care, and also on decisions related to investments in child human capital and fertility decisions. Section 2.3 examines the suitability of relying on long-term savings, and the constraints to saving for retirement outside of pension schemes. While traditional forms of support will likely remain important, older people face considerable risk that they may not be sufficient, which argues in favor of the development of fiscally sustainable pension programs.

Section 3 considers how participation in pension programs in LMICs responds to program rules, including the payroll tax rate, the retirement age, and the link between contributions and benefits. Section 3.1 shows how the research on the optimal design of pension rules in LMICs has gradually incorporated a finer empirical description of the availability and persistence of formal employment over people's lives. These studies estimate or calibrate models to replicate the decision to seek formal or informal employment. In this paper, labor informality is understood as non-compliance with labor regulations in general and pension contribution requirements in particular.[7] This structural and normative literature is increasingly supported by causal evidence on the elasticity of formal employment to pension rules and their enforcement. Reviewed in section 3.2, this evidence considers pension participation along different margins. Initially focused on the dichotomous decision to work formally versus informally, it has recently incorporated the propensity of registered workers to under-report their earnings. The increased availability of administrative pension records, combined with natural experiments generated by cohort-based pension reforms, has been instrumental in building this knowledge base.

Section 4 looks at the evidence on nonfinancial obstacles to participation in pension schemes in LMICs. Lower institutional capacity, pension knowledge, financial literacy,

[7] See Ulyssea (2020) for a survey of the recent literature on the determinants of informality.

and trust in governments all magnify barriers to participation relative to the high-income countries (HICs) that have been subject to most research efforts. Further, these barriers can be more easily circumvented in HICs by implementing default participation mechanisms through employers. Indeed, despite a high self-reported willingness to contribute in LMICs,[8] voluntary participation in pension schemes outside formal salaried work remains very low.[9] Recent experimental and quasi-experimental studies have evaluated how lifting specific barriers impact registration and ongoing participation. The interventions include providing personalized pension information and financial education; improving perceptions about a program; hand-holding participants through administrative procedures; and nudging them to contribute through text messages or push notifications from smartphone applications.

From this literature, it is evident that financial incentives embedded in pension rules significantly affect participation, at least among salaried workers. The propensity to contribute tends to decline if non-contributory pensions are too generous, the benefits of participation too low, or if payroll contribution rates are too high.[10] The extensive margin (whether to contribute or not) exhibits moderate elasticities, but the intensive margin (wage under-reporting) appears to be very sensitive to financial incentives. Therefore careful pension design that integrates the contributory and non-contributory dimensions is needed to maximize pension revenue while preserving welfare gains from improved insurance (Palacios and Robalino, 2020).

To optimize the coverage of pension systems, several questions remain underinvestigated. For example: are partial or full lump-sum options for withdrawals and retirement benefits attractive (e.g. to buy a house or pay for medical expenditures)? Can bundling pensions with short-term social insurance (e.g. health or work injury) free up resources for long-term saving? Does labor informality within registered firms respond differently relative to other forms of informality? What is the role of peer effects and social norms

[8] See e.g. Mitchell and Mukherjee (2017).

[9] See Guven et al. (2021).

[10] Matching pension contributions are also often cited as a way to stimulate participation, but little evidence exists in LMICs (Holzmann et al., eds, 2009).

regarding obligations to contribute? Also, the literature has benefited from better availability of administrative pension data, but the evidence remains too concentrated in a few middle-income countries in Latin America. And administrative records usually contain little information on household composition, health, human capital, or employment characteristics, and therefore do not lend themselves to very granular analyses. The collection of survey data that is linked to administrative records is an approach that combines the best of both worlds.

Outside salaried work, stimulating voluntary enrollment and ongoing participation remains a challenge due to multiple compounding behavioral barriers and despite high self-reported willingness-to-pay for pension coverage. Informal workers often lack an understanding of pension programs, particularly regarding future annuity payouts. Combined with high transaction costs and lack of trust, the imbalance between perceived costs and returns severely limits participation. There are some indications that targeted and personalized information provision can help, but more policy innovation and experimentation will be needed. Ideas include identifying quasi-formal groups of workers, such as day workers with long-term employment relationships with formal firms, or enlisting online job platforms or business associations as program delivery partners. While pension product adoption suffers from specific behavioral barriers due to the long horizons involved, experimental designs could be borrowed from neighboring fields that studied the adoption of shorter-term savings products,[11] or other social insurance programs such as health or index insurance.[12]

Further, the literature shows that the introduction of pension benefits only partially crowds-out traditional strategies to cover longevity risk (inter-vivos transfers, fertility, investment in children). Given fiscal constraints, these will remain important strategies for many older people in developing countries. Conversely, there are also many theoretical synergies between public pensions and traditional support. Access to even a modest pension provides a means of coping with the risks inherent to these strategies if transfers fail to materialize or savings prove insufficient. Once individuals and families develop

[11] Reviewed in Karlan et al. (2014).

[12] See Torm and Oehme (2024) and Banerjee et al. (2024).

trust in a pension system, the prospect of pension income can also profoundly reorganize old-age support systems, by allowing caregivers to resume labor market activities or increasing the bargaining power of elderly pension recipients within their household. Such spillover effects need to be more systematically explored so that robust institutions can be designed for more comprehensive social protection in an aging world.

2 Pensions, savings, and alternative sources of support in LMICs

Before the 20th century, support for the elderly was generally provided through multi-generational households. In such traditional settings, transfers among family members are provided in kind. These amount to shared food, shelter and care-provision (for children or the elderly), and support through working in either agricultural activities on shared land or in family-operated non-agricultural enterprises. In many low- and middle-income countries today, considerable support is still provided through such traditional arrangements, but strains on these arrangements are evident with changes to household structure. Across East Asia, for example, demographers and economists have concluded that the well-being of the rural elderly may have suffered with the transition to living in nuclear families.[13]

With the decline in multi-generational living arrangements, financial transfers from family members and own savings may both offer substantial support in old age. Advances in technology and the spread of digital banking facilitate financial transfers and long-term savings, but both are subject to shocks that can leave older people at risk of falling into poverty. Extension of pension coverage, and the decision to enroll and par-

[13]Evidence from East Asia is documented in Cambodia (Zimmer and Kim, 2002), Thailand (Knodel and Chayovan, 1997), and Viet Nam (Anh et al., 1997). Benjamin et al. (2000) note that in Northern China, over 85% of the rural elderly lived in extended households in 1935, but that this figure had dropped to just over 60% by 1995.

ticipate among potential beneficiaries, requires recognition of their potential role as an additional source of financial support, and as a source of insurance against poverty in old age.

Section 2.1 documents the roles played by transfers from family members (or within a community or clan) to assist older people. Declines in family size also influence the potential scope for insurance through financial transfers, and raise the potential value of pensions as a complementary source of support. Next, section 2.2 examines the potential spillover benefits that pensions may have on decisions related to both care arrangements for the elderly and investment in children. Finally, section 2.3 highlights the interaction between pensions and the long-term savings behavior of households, again highlighting the role for pensions in guaranteeing support at older ages.

2.1 Private transfers and support through pensions

The appeal of pension programs depends on the availability and quality of other means of old-age support. Support from family members, whether through financial transfers, or transfers of time and support through co-residence, are frequently understood through Becker's theory of social interactions (Becker, 1974), an approach that lends itself well to thinking about formal transfers (e.g., pensions and other support) relative to informal transfers among family and others. From a theoretical perspective, motives for transfers stem from either altruism, responding to the needs of a family member, or exchange motives, reflecting compensation for services (e.g., care for children in the households, past investments in an adult child's human capital, the value of housing provided, or other services).

Both altruistic and exchange motives may lie behind the support that older people may expect from adult children, but distinguishing the two motives helps to think about the threats to support from demographic and cultural changes that may occur with development. When examining private transfers in developed economies, both across households of any age (Cox, 1987) and explicitly across generations (Cox and Rank, 1992), Donald Cox and co-authors have generally found that transfers are best explained by an ex-

change motive. In the United States and other high-income countries, established formal support, from social security to supplemental security income in the United States, is sufficient to protect the elderly from extreme poverty. Turning to developing countries where formal pensions are lacking, however, both altruistic and exchange motives may influence transfer decisions. When households have low levels of income before receiving financial or in-kind transfers, and transfers from family members are driven by an altruistic motive, one might worry that receiving a pension could crowd out private transfers. When the elderly are more affluent and exchange motives dominate, the effect of receiving a pension on private transfers is indeterminate (Cox et al., 2004).

The introduction or expansion of formal pensions is often used to understand their impact on private transfers. In South Africa, a significant increase in public pensions after the end of apartheid led to a 25 to 30 percent reduction in private transfers, but it did not fully crowd them out. Further, despite a large increase in income, there were no significant changes in migration, labor supply or household composition (Jensen, 2004). In urban China, when retirees faced arrears to pensions during the economic restructuring of the late-1990s, adult children responded to low incomes by increasing support to parents (Cai et al., 2006), suggesting an altruistic motive, but this support covered only between 52 and 68 percent of the shortfalls associated with pension arrears, offering additional evidence that pensions do not fully crowd out potential private transfers.

Low levels of pension support are unlikely to crowd out private transfers, but may be of particular importance for preventing older people from falling into poverty when private transfers fail to materialize. Private financial transfers from migrant children to older parents left in China's rural villages also tend to be sensitive to low incomes among parents, but the variance in realized transfers suggests considerable risk that adult children may not be able to respond to the financial needs of older parents — or may not be aware of parent needs (Giles et al., 2010). In this setting, the extension of a pension to China's rural residents through the New Rural Pension Scheme (NRPS) played an important role in reducing the incidence of poverty among China's older rural residents. As the social component of the rural pension amounts to roughly one-quarter of the rural poverty line, it is not surprising that there is little evidence that it crowds out private transfers even as

it is associated with reduced poverty and improved nutritional status (Huang and Zhang, 2021).

Research using tools from macroeconomics also highlights the potential benefits of pensions. Jung and Tran (2012) calibrate a dynamic general equilibrium model to examine the potential effects of introducing a pension program to informal sector workers. The authors find efficiency losses due to adverse effects on capital accumulation and the allocation of resources across formal and informal sectors. Consistent with micro evidence on the extension of pensions, however, they find that welfare increases overall from positive insurance effects associated with the extension of the social insurance system.

2.2 Pensions, fertility decisions, care arrangements, and investment in children

Access to a pension at older ages not only increases the well-being of the elderly, but may also affect resource allocations within the family and has the potential to influence decisions ranging from the number of children to raise, to care responsibilities for older people and decisions over human capital investments in children.[14] As the prospect of pension support influences long-term planning for older ages, shapes decisions over fertility and investments in children, and reduces overall income risks faced by extended families, there are significant spillover benefits for the larger family from expanded access to pensions.

Where having a child is important for guaranteeing support in old age, demographers and economists have long argued that access to a credible pension will contribute to a decline in fertility (Leibenstein, 1957; Nugent, 1985). Empirical evidence, however, is more difficult to come by. Rossi and Godard (2022) use the expansion of a social pension in Namibia during the 1990s as a quasi-experiment to examine the pension impact on

[14] Edmonds (2006) documents large increases in schooling attendance and declines in total hours worked when black South African families became eligible for social pension income. Similarly, a social security reform in Brazil led to increased school enrollment and reduced labor participation (De Carvalho Filho, 2012).

fertility. The authors show that introducing a social pension for the elderly led to a decline in fertility for younger cohorts, driven by significant effects on fertility of women over age 25. As a result of the expansion of the pension, reports of the ideal number of children also declined from an average of 4.6 to 3.2 between 1992 and 2014.

A social pension that does not require a contribution may differ from a pension in which participants must contribute to receive a government match. China's NRPS has provided an interesting opportunity to examine effects of both the social and contributory features of the pension. The NRPS was phased in after 2010 and provided a basic government funded benefit to those over 60 when the pension became available. Younger cohorts are required to make minimum monthly contributions to qualify for a pension when they reach retirement age, and may opt to contribute at higher levels as well.

Two recent papers, Shan and Park (2023) and Guo et al. (2025), exploit the gradual rollout of the NRPS to examine the effects of the minimum guaranteed social pension component on support received by the elderly, and the effects of the contributory pension on investment in children. As receiving a pension alleviates resource constraints in multi-generation households, it may lead to more investments in children (an income effect). In contrast, the option of investing in a pension may have both substitution and income effects. The present value of future pension benefits will be greater than current investments in children and will create an income effect, but returns to a pension are an alternative to returns from a child and so a substitution effect influences current investments in children. In rural China, there is an interesting gender component as well that is highlighted by both papers: by tradition sons are expected to support their elderly parents, and son preference may create stronger incentives to invest in sons (and their future wives) who will provide support in old age. The introduction of the pension, as an alternative source of future support, may change incentives to invest in the children of both genders. The income and substitution effects operate in different directions, and it is uncertain which will dominate.

Shan and Park (2023) find that the introduction of the NRPS reduces net transfers from adult sons to elderly parents more than it reduces transfers from daughters, which one might expect as sons were already providing more financial transfers to parents be-

fore the implementation of the NRPS. With increased household income from pension receipts of those over 60 and expected future transfers from sons, investments in the education of sons increase (an income effect dominates for sons). Working-age parents also make contributions to their own pensions, and these investments are found to crowd out educational investments in daughters (the substitution effect dominates).

Guo et al. (2025), by contrast, more explicitly focus on the exchange motive for transfers, and the role that an adult child plays in providing instrumental care for elderly parents. They thus examine the effects of the NRPS on co-residence with elderly parents and expectations related to future care provision. The key child investment measure examined is the bride price (for sons) and the dowry (for daughters), and not educational investments in children. In common with Shan and Park (2023), Guo et al. (2025) find that the NRPS reduced provision of care for elderly parents, reflected in this paper in reduced likelihood of co-residence, and that this effect was stronger for sons, who generally are expected to provide care through their families. Bride price, interpreted in the paper as an investment in a son, decreased significantly with introduction of the NRPS, while there was no effect on dowries paid when daughters were married.

Why might investments reflected in bride price fall even as investments in education are increasing for sons? A dowry is an investment in a daughter-in-law, and may also be viewed as an investment in one's own future care. While sons are expected to be responsible for the care and support of their elderly parents, much of the caregiving responsibility actually falls on daughters-in-law. With the introduction of the NRPS, the decline in bride price reflects beliefs that the specific daughter-in-law may be somewhat less important. As there is no market for hired eldercare in rural China, one must regard this as a somewhat surprising result.

2.3 Saving for old age in developing countries

Declines in fertility will lead to smaller family sizes and fewer sources of financial and instrumental support for older people, and so one might ask whether private savings over the life-cycle may be sufficient as a substitute for family support or a formal pension.

Existing cross-country evidence suggests that savings increases with economic growth and the demographic transition, but that significant shares of people are not saving for old age, raising the potential benefits of participation in a contributory pension scheme. Using data from the Global Findex database, Demirgüç-Kunt et al. (2016) note considerable variation in saving for old age across economies, ranging from 39.7% in high-income OECD economies to only 9.8% in Sub-Saharan Africa and 7% in the Middle East and North Africa. While saving for the specific purpose of consumption in old age is low in most LICs and LMICs, both financial literacy and trust in the financial system are associated with higher levels of saving. Not surprisingly, savings rates are much higher among those who have bank accounts, and among those with high incomes and more education. Increases in the share of those over 60 receiving a pension are associated with a small reduction in saving (a 10% increase in the share of a country receiving a pension is associated with a 0.35% reduction in the probability of saving for old age), suggesting that the introduction of a contributory pension would not crowd out private saving. Finally, there is little evidence that pension system provisions and contribution rates have any impact on saving for old age.

Within-country, micro evidence suggests that life-cycle wealth increases with economic growth, yet much of this wealth is in relatively illiquid forms. Joubert and Kanth (2022) notes that between ages 25 and 65, Pakistani heads of household accumulate 4.2 years' of consumption, but most of this is in housing. Housing wealth, and savings for future purchases of housing, are significant motives for saving, even in settings where it is not easy to access housing equity. A range of papers have examined high savings rates in China. Painter et al. (2022) suggest that housing wealth, though highly illiquid, is a form of precautionary saving in China, and Chamon and Prasad (2010) find a significant precautionary motive for saving among China's urban households that is associated with health expenditure risk, which is driven primarily by the age of the household head in their model.[15] As it is difficult to access the equity in a home in many developing coun-

[15] Wei and Zhang (2011) exploit county-level difference in sex ratios to show that high savings rates are associated with competition among families to marry sons, which requires the purchase of a home. Given

tries, it is unlikely that housing wealth is a direct substitute for a potential pension.[16]

The fact that life-cycle wealth is stored primarily in housing could reflect lack of access to other safe, high-return, and trustworthy long-term savings instruments (Demirgüç-Kunt et al., 2016). Low financial literacy, numeracy, lack of familiarity with formal banking institutions all create barriers to participation in other forms of saving. If that is the case, offering informal workers access to pension programs could help them diversify away risks associated with housing wealth. Owning only housing wealth leaves households exposed to catastrophic events such as the floods that affected much of Pakistan in 2022, causing USD 5.6 billion in housing damage. With the advent of climate change, such weather shocks may become more frequent, raising the value of combining several long-term savings solutions.

Direct evidence of potential demand for pensions among informal workers is relatively sparse, but some recent research has attempted to make headway on adoption and willingness to contribute. Mitchell and Mukherjee (2017) conduct interviews among 770 households in 70 communities about interest in participating in a micro-pension product offered by India's National Pension System. In this program, the government matches the first Rs. 1,000 (US$20) contributed by a policyholder. The government then invests the funds, and policyholders are guaranteed returns of at least their principal while the funds are invested. They may contribute up until age 60, and have the option to withdraw up to 20 percent for an emergency prior to age 60. The field experiment varied the ordering of questions and some pension parameters to assess both willingness to adopt and willingness to contribute. Stated interest in participation is high at 80%, and respondents with some financial literacy (and normal savings accounts) were more likely both to adopt and contribute to the micro-pension product.

Overall, weakening traditional systems, a capacity to save in illiquid form and the

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the role that daughters-in-law play as future care providers, one might view this as an indirect form of saving for old age.

[16]Housing wealth may indirectly affect support from adult children if a strategic bequest motive raises both financial and instrumental support from competing children (Bernheim et al., 1985).

high levels of interest in pension coverage and participation consistently expressed by informal sector workers stand in contrast to the low rates of actual enrollment and saving typically observed when voluntary pension schemes are offered (Guven et al., 2021). To explore this paradox, section 3 examines how the financial incentives embedded in pension schemes affect the rate of participation, and Section 4 reviews recent evidence on multiple administrative, informational and behavioral obstacles to participation.

3 Pension program design and participation in LMICs

LMICs tend to have a limited capacity to enforce labor regulations. Individuals may work without declaring their activity to the government and, in particular, avoid participating in pension programs — a phenomenon known as "labor informality" (Almeida and Carneiro, 2012). As a result, pension designers must worry about the economic incentives to participate: workers for whom the cost of payroll taxes outweighs the value of future benefits accrued from these payroll taxes may evade contributions by working in unregistered self-employment, or colluding with an employer to under-report their earnings, fully or partially.

These considerations matter less if the labor market is strongly segmented into a formal and an informal sector. Under this view, informal sector workers have no real employment opportunities in the formal sector because their productivity is too low relative to the minimum wage. Conversely, the monetary or non-monetary advantages associated with formal employment far outweigh the benefits of evading payroll taxes. However, evidence of common movements between formal and informal jobs (Maloney, 1999) and of unregistered work within formal firms (Ulyssea, 2018) have called into question a strict duality of labor markets in LMICs.

In recent decades, major pension reforms and data collection efforts in Latin America have brought academic attention to the question of participation in pension schemes in LMICs. Initially focused on the macroeconomic impacts of pension privatization, the literature has moved in the direction of (i) modeling informal employment opportunities more finely at the micro level, (ii) characterizing the fiscal and welfare trade-offs attached

to key pension rules, and (iii) accumulating causally identified evidence on how participation in pension programs responds to different incentives created by program design.

Section 3.1 reviews how labor supply models have incorporated informality to study pension design. This strand of the literature estimates or calibrates the parameters of such models before simulating them to understand the effects of actual pension reforms and compares them with alternative policies. Successive studies have incorporated new mechanisms to characterize the availability and persistence of formal employment over the life cycle. We review how responsive active pension participation is to pension rules in these models.

This structural (i.e. model-based) literature is increasingly complemented with causal empirical evidence on this responsiveness. Reviewed in section 3.2, these empirical studies examine pension participation along several margins. Initially, they focused on the dichotomous decision to work formally versus informally, but the literature has recently examined the propensity of registered workers to under-report their earnings in response to pension incentives. The evidence is often obtained using administrative pension records, which have become more commonly available, coupled with the natural experiments generated by pension reforms that apply only to certain birth cohorts.

The structural and (quasi-)experimental approaches in the literature yield similar results. The moderate elasticities measured on the extensive margin of participation (whether to contribute or not) are consistent in direction and size with the structural elasticities generated by the estimated dynamic models reviewed in section 3.1. Recent evidence further suggests that the intensive margin (wage under-reporting) is quite responsive to pension rules, with sizable fiscal consequences.

3.1 Incentives to contribute to pensions when labor informality is widespread

The wave of pension privatization reforms that swept throughout Latin America and Eastern Europe from 1980 to the early 2000s motivated much of the early research on pension design in LMICs. Pioneered by Chile in 1981, pension privatization replaced publicly managed "pay-as-you-go" programs — in which current workers pay for current

retirees' pensions — with privately managed individual pension accounts. These new systems were expected to minimize the distortions to the price of formal labor caused by pension payroll taxes. The argument was the following: with redistribution kept to a minimum and a stronger sense of ownership over their accumulating pension funds, workers would interpret payroll contributions as savings rather than taxes. High expected returns to pension assets invested in diversified financial instruments would also allow lower payroll taxes for pensions. The temptation to evade these contributions would therefore all but disappear. Building on this intuition, an early theoretical literature sought to analyze the macroeconomic impacts of pension privatization using two-sector overlapping-generations (OLG) economies where the representative household allocates a portion of their lifetime labor supply to informal work which is not subject to taxation or social security contributions (e.g. Corsetti, 1994 and Schmidt-Hebbel, 1997). In these models, net wages are equalized across the two sectors and labor reallocates freely in response to pension reforms, producing a highly elastic, i.e. responsive, pension participation. In a recent paper, McKiernan (2021) builds on this approach but incorporates ingredients that generate more subdued labor reallocation patterns, such as worker heterogeneity in age and productivity and an imperfect substitutability of formal and informal work in the utility function.

The academic literature has continued to respond to the policy innovations that have appeared since then, such as the introduction of social pensions with broad eligibility (Holzmann et al., eds, 2009, Banerjee et al., 2024). As privatized pension systems matured in Chile and elsewhere, it became increasingly apparent that pension reform was not leading to declines in informality. Despite improved incentives to contribute, administrative records revealed large numbers of workers with incomplete or sporadic contribution histories (Sanromán et al., 2011). Infrequent contributors were *de facto* not covered by the system: not only were their projected pension benefits very low but they would also not qualify for the existing minimum pension, which required lengthy vesting contribution periods. These gaps in coverage prompted popular discontent with pension programs, the introduction of non-contributory features in the pension architecture and even a partial reversal of the wave of pension privatizations (Ortiz et al., 2018). Economists were

quick to point out that non-contributory social pensions can "cannibalize" contributory pensions: if workers expect to receive old age benefits regardless of what they pay into the system, their incentives to contribute diminish (Levy and Schady, 2013). In technical terms, non-contributory pensions loosen the link between contributions and benefits and implicitly tax pension contributions.[17]

Whether payroll tax distortion leads to meaningful reductions in participation depends on whether workers can easily switch between formal and informal jobs. To capture this, Joubert (2015) adapts a life cycle discrete choice model of occupation à la Keane and Wolpin (1997) in which workers choose between formal and informal jobs. To produce realistic switching behavior, the model allows for heterogeneity in skills, occupation-specific human capital, as well as rationing of formal jobs. Anticipating the effects of their decisions on future consumption and retirement benefits, workers decide where to work and how much to save outside the pension system. The parameters governing preferences and employment opportunities are estimated to fit patterns of labor supply persistence extracted from linked survey and administrative data. Because pension rules — such as the contribution rate and/or pension benefit formulae— are explicit in the model, parametric reforms of the pension system can be simulated. For example, increasing the contribution rate from 10% to 20% raises informality among men by 7.3pp (25.3%) and 5.3pp (15.9%) among women. The effect is concentrated among the more sporadic participants and evasion accelerates at higher contribution rates.

Subsequent contributions to the literature have augmented this framework in different ways. To analyze gender gaps in pension benefits — a major policy concern — Joubert and Todd (2024) propose a collective model of the household which aggregates the husband's and the wife's value functions so that separation and widowhood risk can be incorporated. In a recent working paper, Finamor (n.d.) proposes a model that distin-

[17] In systems like Chile's, where the contributory and non-contributory benefits are integrated, this link is governed by the rate at which government transfers are reduced or "clawed-back" if workers accumulate pension contributions. In defined benefit systems, the contribution-benefit link is less transparently embedded in the pension benefit formula, which is usually relatively more generous for lower-earners.

guishes between salaried informal work, which commands lower wages, and informal self-employment, which requires an initial capital investment. The model can match life-cycle dynamics between the different forms of informality: younger, low-wealth individuals are more likely to accept low-pay informal employee jobs, but they search for — and over time switch to — more valuable formal jobs. As they accumulate savings, some formal workers switch to self-employment and earn income that supplements social insurance benefits at older ages. The model is used to simulate an increase of the contribution rate from 10% to 16% of taxable earnings, a recently adopted reform in Chile. The higher contribution rate is predicted to reduce formality by 3pp. Introducing a 30% claw-back of the minimum pension benefit also reduces formality by up to 2.1pp near retirement ages. Moreno (n.d.) embeds the households' dynamic decision problem into an overlapping-generations framework complete with an explicit government budget equation. Removing Peru's contributory pension programs altogether in a policy experiment increases formality by around 6 percentage points or 18%.

Most studies mentioned so far take a purely positive approach and simply report predicted impacts of policy experiments. Joubert (2015) proposes a relatively simple normative exercise which consists in minimizing the system's costs under the constraint of guaranteeing a consumption floor in old age, accounting for employment and saving behavioral responses to changes in each parameter. He finds, for example, that a higher minimum pension claw-back rate would reduce the cost of the system while preserving the consumption floor. By contrast, Cabezon (n.d.) adapts the sufficient statistic framework in Kolsrud et al. (2024) to determine the optimal design of pension rules in the presence of informality, connecting the social planner's problem to key empirical elasticities. Notably, he also allows for present-bias on the part of workers, so that a pension program may be necessary to help them save optimally. Considering the Chilean pension system and its reforms, the paper estimates the optimal amount of redistribution to be embedded in the pension rules. He finds that more redistribution creates significant distortions in the form of more informality and lower savings, but the welfare gains in terms of insurance more than offset the cost of these distortions.

3.2 Empirical evidence on the elasticity of pension participation

Overall, the structural literature reviewed above consistently produces impacts of pension rules on formality that are significant but moderate in size. While the magnitudes of these responses have important fiscal implications, particularly when compounding several pension rule adjustments, they remain compatible with the aggregate observation that pension privatization did not do away with informality and pension evasion. Intuitively, the formality disincentives embedded in the pension rules are dampened by the employment uncertainty faced by individuals over decades-long careers: early on, they cannot perfectly anticipate whether they will meet the minimum pension eligibility criteria, for example. As discussed above, the stickiness of employment decisions and worker heterogeneity further moderate the overall response. A growing set of empirical studies measure these same elasticities but identify them from natural experiments in which groups of workers were affected differently by a pension reform.

Pension rules are typically homogeneous within countries, and early estimates of their impact on formality relied on cross-country comparisons (Cox and Jimenez, 1992, Packard, 2002) to which the usual interpretative caution applies. More recent studies consider changes to payroll taxes (sometimes in the form of wage subsidies) in LAC, Türkiye, or Ethiopia, using different control groups to isolate the effects. The impacts on formal employment (and therefore pension participation) range from null effects (Gruber, 1997; Cruces et al., 2010; Bedi et al., 2022) to increases (resp. decreases) in the range of 4%-10% for a 10% reduction (resp. increase) in payroll taxes (Kugler and Kugler, 2009; Betcherman et al., 2010; Kugler et al., 2017; Asik et al., 2022). Intuitively, impacts should vary based on the ability of employers to pass an increase in labor costs on to their employees in the form of lower wages (or vice-versa). For example, larger employment effects can be expected in the presence of downward wage rigidities. Conversely, if social security benefits are highly valued, net wages should more easily adjust, dampening employment effects. Note that the payroll taxes examined in these studies typically combine health and pension contributions which could each affect participation to a different extent.

Recent empirical research has increasingly leveraged administrative pension records,

focusing on cohort-based pension reforms to generate causal estimates of behavioral elasticities. Using the differential exposure of different birth cohorts to reforms of pension benefit levels and accrual rates, Becerra (2024) and Tanaka (n.d.) show that participation is responsive to the effective returns obtained by participants on their pension contributions. Becerra (2024) considers a 1993 five-year increase in the vesting period required for obtaining the minimum pension in Colombia, which applied only to young enough cohorts. Using a regression discontinuity approach, he finds that formality declined by 2.8pp or 10%, with the effect concentrated among highly educated men. Tanaka (n.d.) provides rare evidence outside LAC on a related policy change. He considers a voluntary pension scheme for Mongolian herders, exploiting a policy that effectively shortened the contribution period to obtain a minimum pension benefit for some birth cohorts, creating exogenous variation in the expected value of participating in the scheme. He finds that a 10% increase in money's worth raises participation rates by 0.8-1.7pp (3%-19%) depending on birth cohort. The recent contribution by Cabezon (n.d.) also exploits differential exposure to the great financial crisis to show that a decrease in pension wealth increases participation through a wealth effect.

Recent studies have shown that the financial incentives embedded in pension system rules can also affect the extent to which workers under-report their formal wages. Considering changes that occurred with pension privatizations in Mexico and Uruguay, Kumler et al. (2020) and Lauletta and Bérgolo (n.d.) both find that a stronger link between contributions and benefits reduces wage under-reporting among younger workers under the privatized system. Defined benefit systems generally exhibit weaker contribution-benefit links because their pension benefit formulas usually embed redistribution from higher to lower earners. In addition, as Lauletta and Bérgolo (n.d.) point out, many LMICs base pension benefits on annual wages in the last few years before retirement, because they form an easy criterion to verify without complex record keeping. As a result, incentives to report high wages are low early in workers' careers. Dean et al. (2024) shows that self-employed workers and dependent workers in small firms increase their reported earnings by 6% when they enter the time window prior to retirement in which reported wages affect pension benefits the most. Under Brazil's defined benefit system, Feinmann

et al. (2022) also find that reported salaries start bunching around the maximum taxable income when they approach retirement (presumably they were under-reported earlier) as a way to boost their pension benefits.

3.3 Discussion

Overall, natural experiments and structural studies yield impacts that are consistent in direction and magnitude. The propensity to contribute can decline in if non-contributory pensions are too generous, benefit accrual rates are too low, or if payroll contribution rates are too high. The extensive margin (whether to contribute or not) exhibits moderate elasticities such that realistic parametric changes to the contribution rate or the claw-back rate shift participation by 2-8pp. The intensive margin (what wage level to report) appears to be very sensitive to financial incentives, with sizable fiscal implications.

This evidence, however, is drawn overwhelmingly from a few countries in Latin America. Labor market conditions differ in other regions, raising concerns about the external validity of these estimates. Furthermore, the reliance on administrative records allows for limited exploration of mechanisms, or heterogeneity analysis. Given the stickiness of employment decisions, the differences in access to formal employment for workers with different skills, and differences in valuation of the pension benefits, there is likely to be considerable heterogeneity in the elasticity of formal employment across workers. One reason why Chile has received so much attention is the availability of a link between a longitudinal household survey and the administrative pension records of the survey respondents. Similar efforts in other world regions could help fill the remaining evidence gaps.

On the theoretical front, many mechanisms that connect pension design and informality remain under-researched. For example, recent empirical evidence suggests that transitions between formality and informality often occur within registered firms, requiring the collusion of employer and employee (Ulyssea, 2018, Samaniego de la Parra and Fernández Bujanda, 2024). Variation in enforcement intensity (labor inspections), employer labor market power, downward wage rigidities and, crucially, the worker's val-

uation of future pension benefits could affect the frequency of this form of informality and therefore pension revenue. Another unexplored possibility noted by Kumler et al. (2020) is that employers mislead their workers in the extent to which they contribute on their behalf. The payout phase is also largely under-researched, despite the fact that LMICs exhibit specific features — such as the frequent use of lumpsum payments and programmed withdrawals, which do not insure against longevity risk — due to limited ability to keep records and/or the lack of functioning annuities markets. To speak to recent developments such as rising anti-pension fund administrator sentiment in Chile or the nationalization of Argentina's pension system, institutional trust and political economy considerations should also be incorporated as key determinant of "pension contribution morale."[18]

4 Nonfinancial barriers to pension participation

Despite the potential demand for old-age pensions (Mitchell and Mukherjee, 2017), several barriers hinder informal workers in LMICs from participating in pension schemes, including complex administrative processes, behavioral constraints, and issues of trust. Compared to disincentives related to program design, which were highlighted in the previous section, these issues are particularly relevant in countries with lower income levels, where self-employment is widespread, and administrative capacity is limited. Some of these barriers may well exist even in HICs, but they remain "hidden" because employers take on the transaction and information costs when they enroll their employees and collect contributions from them. In the behavioral literature on HICs, mandatory default options are presented as the most effective solution for increasing retirement savings (e.g., Chetty et al., 2014). However, adapting them for informal workers in LMICs is challenging as a large fraction of them are self-employed or operate micro-enterprises with no link to central administrations. Furthermore, the behavioral hurdles to short-term saving

[18] "Tax morale" refers to the strength of the social norms preventing individuals from evading taxes, regardless of their individual calculus.

identified in the recent development literature (Karlan et al., 2014; Badarinza et al., 2019) — commitment, trust, administrative challenges, and financial literacy — are magnified in the case of pension participation. For example, limited financial literacy in LMICs may affect long-term savings decisions more substantially than short-term savings due to time horizons and behavioral frictions. Additionally, political instability, low administrative capacity and high levels of corruption can erode trust in governments in LMICs. This section reviews the evidence on these barriers.

4.1 Administrative hurdles and lack of program awareness

Contributory pension systems are complex. Effective pension administration requires comprehensive institutions for tasks such as pension design, contribution collection, information dissemination, and benefit provision (Bloom and McKinnon, 2014). Governments need to encourage informal workers to participate in pension programs — whether compulsory or voluntary — through effective implementation.

Contribution collection, similar to tax collection, is particularly challenging in countries with weak state capacity (Besley and Persson, 2014). Recent evidence suggests that accurately measuring wages, even from formal firms, is difficult. As we have already seen in the previous section, government pension authorities may not capture wages accurately if formal firms under-report wages paid when there are weaker links between contributions and benefits (Kumler et al., 2020; Lauletta and Bérgolo, n.d.). Difficulty capturing wages is not limited to under-declaration because certain pension schemes also unintentionally incentivize workers to overstate their income. Some pension systems calculate benefits based on the average income from just a few years before retirement due to challenges in maintaining comprehensive contribution records. In such cases, individuals may have incentives to overstate their income during these periods to enhance pension benefits, potentially jeopardizing the financial sustainability of the pension system.

Moreover, there are administrative challenges to application procedures. Certain vulnerable populations face difficulties accessing even non-contributory pensions. Gupta (2017) conducts a field experiment investigating barriers to pension take-up among el-

derly women in India. She finds that support with application procedures increases application rates by 41 pp. This effect is larger among women who are illiterate and politically disconnected, while information provision alone is effective only among literate women. Application procedures for contributory pensions are likely to be even more challenging, as participants must make contributions before receiving benefits.

The role of administrative personnel is not limited to application assistance. Advertising activity of sales representatives may change the perceptions of the pension products among potential participants. Hastings et al. (2017) study how sales people influence participation decisions in the Mexican private pension market. Using variation in the intensity of sales activity and structural modeling, they find that advertising through sales personnel builds brand value and decreases price sensitivity among workers by limiting their attention to fees. Workers with low education levels are particularly likely to switch to funds with higher fees, resulting in reduced retirement savings. The authors argue that, from the standpoint of welfare, demand-side policies, such as improving financial literacy, are important for enhancing workers' awareness and sensitivity to pension costs.

Given the complexity of pension schemes, individuals often lack a clear understanding of them. Information is critical because contributory pensions represent a type of long-term financial contract involving substantial expenditures within a complex framework. However, insufficient staff and lack of training opportunities may constrain the provision of information in LMICs.

Recent studies assess the effects of disseminating information about pension schemes, finding heterogeneous effects. Giles et al. (2021) run a field experiment in China between two rounds of a longitudinal survey. They randomly provide a subset of households with information about pension programs, including the costs and benefits of the program, instructions on how to enroll in their city, as well as the portability of the contract when moving to another city. They find a positive impact on pension participation among informal workers who are young enough to fully benefit from the program, and emphasize the need to tailor the content of messages, especially vesting periods, to specific audiences.

Automatic enrollment with salary deductions has been shown to be effective in HICs

(e.g., Chetty et al., 2014), but most potential pension participants in LMICs are self-employed workers who would have to make contributions themselves on a regular basis. In remote areas, this can involve substantial costs. Tanaka et al. (n.d.) assess this barrier in a field experiment in Mongolia, the world's least densely populated country. They randomly distribute leaflets explaining how to make contribution payments via mobile phones to informal workers in rural areas. This treatment increases the contribution payment rate by 1.42–1.44 pp, which is 9.28%–9.41% of the unconditional mean in the control group, with a particularly large effect among those living far from town centers. Their findings suggest that technology can help overcome physical barriers to long-term savings, aligning with the extant literature on using mobile technology to facilitate saving (Mbiti and Weil, 2015; Jack and Suri, 2014).

Increasing the number of access points for contribution payments offers another approach to reducing transaction costs. Bosch and Rubli (2023) examine the impact of an expansion of payment channels through 7-Eleven stores in Mexico. Using variation in the presence of 7-Eleven stores at the municipal level and applying a difference-in-differences approach, the authors find a positive effect on the total number of voluntary contributions. However, they also observe a negative effect on the average contribution size, resulting in only a modest impact on the overall flow of contribution amounts. The result implies that the reduction in transaction costs succeeds in encouraging more people to make voluntary contributions or to contribute more frequently, albeit with smaller amounts.

4.2 Financial illiteracy and behavioral frictions

Given the gap in timing between contributions and returns, financial literacy can play a crucial role in the demand for long-term savings. Given that financial literacy levels tend to be lower in LMICs than HICs and are especially low among poor adults and those with less education (Klapper and Lusardi, 2020; Lusardi and Mitchell, 2023; World Bank, 2013), this issue should be particularly relevant for informal workers in LMICs. Impacts of financial literacy on retirement savings have been identified in various countries (for a

review, see Kaiser and Lusardi, 2024). For example, Hastings and Mitchell (2020) find that financial literacy and impatience predict retirement savings in an experimental survey in Chile. A recent comprehensive meta-analysis by Kaiser et al. (2022) finds that financial education interventions have a significantly positive impact on saving behavior overall, although their effectiveness tends to be weaker in developing countries relative to higher-income countries. They argue that this is due to compounding barriers besides financial literacy, which aligns with the research described in the previous subsection. Another possible explanation for the gap is the lack of availability of financial products in lower-income economies.

One important aspect of financial literacy in long-term savings is the concept of compound interest. Not understanding this concept leads to a severe underestimation of future payouts, reducing the appeal of pension products. Song (2020) conducts a field experiment with financial education treatment in China to examine whether misunderstanding compound interest hinders individuals' decisions regarding retirement savings. The intervention includes both retirement income projections and an instruction on compound interest. Households who are taught the concept of compound interest increase their contributions for that year by 40% over those in the control group. Moreover, the treatment effect is more pronounced among those who underestimated compound interest than those who overestimated it. This study suggests that misunderstanding compound interest is a major reason for low pension demand.

Several studies highlight uncertain and inaccurate beliefs about future pension rights (Fajnzylber and Reyes, 2015; Landerretche and Martínez, 2013; Troncoso, n.d.). If individuals find it difficult to project their future pension payouts, providing this information may help update their expectations. For example, Bai et al. (2021) examine the impact of different types of brochures explaining pension benefits in China. Their experimental evidence shows that providing information with concrete pension benefit amounts effectively increases participation among relatively older households (i.e., those aged 45–55 years) without prior pension participants. Additionally, personalized benefit information significantly increases consumption among relatively older households with pension participants, indicating that the intervention succeeded in updating beliefs.

Fuentes et al. (2024) obtain similar results: they examine individuals' errors in pension predictions and the effect of personalized information provision on long-term savings through an RCT in Chile. While the distribution of errors is almost centered at zero without strong systematic bias, some individuals make highly inaccurate predictions. The authors find that providing personalized projections of pension annuity products significantly increases voluntary savings by approximately 10% within the first 8 months. However, this effect is short-term and marginal in increasing overall savings, including compulsory savings. A follow-up survey reveals that personalized information improves the participants' understanding of the pension system and the value of a pension.

In contrast, Olckers (2021) finds a negligible effect of providing a retirement calculator to formal workers via emails in South Africa. Even when another treatment group receives additional explanations about the calculator via telephone, the effect size is not statistically different from zero. He discusses possible reasons for the null effect, such as beliefs on investment return, mortality expectations, and behavioral bias, suggesting that the effectiveness of these interventions varies across contexts.

Overall, as Bai et al. (2021) and Fuentes et al. (2024) show, providing concrete and personalized pension information can be effective. However, while general information provision is relatively less expensive, delivering personalized information to every household requires substantial resources. Digital tools such as smartphones and AI bots may be leveraged to reduce the costs of doing these programs in the future.

Financial illiteracy may also be mitigated through peer influence. A body of literature has examined the role of peers in retirement saving decisions among formal workers in richer countries (e.g., Duflo and Saez, 2003; Beshears et al., 2015; Lieber and Skimmyhorn, 2018). Zhao and Qu (2021) provide a rare investigation of this hypothesis in LMICs. Their study explores the role of peers in pension decision-making in China's New Rural Pension Scheme. Using a binary choice network model with household survey data, they report evidence suggesting significant peer effects on participation decisions and contributions. These effects appear to be more pronounced among older individuals, males, and those with low education. Regional heterogeneity analysis indicates potential effects in villages, while no significant effects are observed in cities or provincial areas. They claim that the

mechanism of peer effects is driven by social norms and the transmission of information about benefits, costs, and risks.

Despite the potential effectiveness of peer effects, experimental research in this area remains limited. Peer effects could be further explored by examining specific contexts in LMICs. For instance, informal workers and the self-employed often engage in various groups, such as cooperatives, platforms, banks, business associations, and community networks. Future research could explore whether these groups effectively stimulate peer effects. Additionally, these aggregators may facilitate default contributions, enhance trust, and improve information provision.

Besides lack of information, behavioral frictions, such as inattention, time inconsistency, and procrastination, may also discourage workers from making regular contributions. Again, while extensive research has examined these frictions in advanced economies, evidence of their impact in pension settings has been limited in LMICs until recently. Recent studies aim to fill in this gap. Azuara et al. (2021) review evidence on behavioral interventions from the Inter-American Development Bank's pilot projects to promote retirement savings at scale — such as reminders, automatic savings mechanisms, simplification of procedures, and financial education — in Latin America and the Caribbean. For example, they argue that reminders are cost-effective, but their effectiveness is short-lasting and primarily benefits individuals who are already saving, and only at a limited scale, based on several pilot projects in Mexico, Chile, and Colombia. Additionally, Gars et al. (2025) show the effectiveness of personalized SMS reminders on retirement savings through RCTs in Chile, highlighting the importance of tailoring message timing to individual preferences. Akbas et al. (2016) also present the effectiveness of reminders among existing customers of a retirement savings product in Kenya. These results imply forgetfulness and inattention often hinder retirement saving behavior, as shown by Karlan et al. (2016).

Related to the inaccurate beliefs about future pensions discussed earlier, such misperception may stem from behavioral bias. Due to the long-term nature of pension savings, individuals with hyperbolic preferences may undervalue future pension benefits. As Ashraf et al. (2006) show, the effectiveness of commitment savings for women ex-

hibiting hyperbolic preferences in the Philippines, appropriate design, and promotion of pension savings products as commitment savings devices, including automatic contributions, could help encourage participation among individuals prone to procrastination. Identifying the sources of misperception and designing targeted interventions are potential avenues for future research.

4.3 Lack of trust

Trust in pension institutions is particularly crucial due to the long-term nature of pension investments. However, low trust in government is widespread in LMICs. Furthermore, the rapid aging of the population raises concerns about the long-term sustainability of pension systems. In Chile, for example, mass protests occurred between 2019 and 2020, fueled by multiple factors, including dissatisfaction with the pension system (Gonzalez and Morán, 2020). In addition, many young workers in China are opting out of state pension programs.[19] A related question is whether trust influences pension savings and how it can be improved. Despite its importance, empirical evidence remains limited. Recently, Tanaka et al. (n.d.) explore this issue using additional treatment in the aforementioned field experiment in Mongolia. They randomly provide informal workers with information on international technical assistance aimed at building trust in Mongolian pension administration through the dispatch of Japanese experts. The results show that the treatment increased their contribution payments by 1.63 pp (10.65% of the mean), implying that foreign aid can reshape perceptions of pension systems.

Further research is expected to measure trust and other factors that influence it. While some individuals may distrust governments, others may be skeptical of pension designs due to their country's population dynamics. The analysis of effective approaches to address these concerns is another important area for future research.

[19] For example: Bloomberg.

4.4 Discussion

Despite high self-reported willingness-to-pay for pension coverage, encouraging voluntary pension enrollment and sustained participation among informal employees remains a challenge. Multiple behavioral barriers interact. Informal workers often have limited knowledge of pension programs, particularly regarding future pension payouts. The imbalance between perceived costs and returns severely limits participation, and these are further exacerbated by high transaction costs and a lack of trust.

The magnitude of effect sizes varies depending on the context and individual needs. Some forms of information provision are effective for certain groups but not for others. Regarding the debate between low demand and administrative barriers, Olken et al. (2024) examine this issue for social insurance in Thailand, concluding low ex-ante valuation of the social insurance is the main driver for the low level of insurance enrollment in their context. However, given the cost implications of stimulating demand through increased generosity, addressing both administrative barriers and demand stimulation would be necessary.

Targeted and personalized information provision shows potential, but further policy innovation and experimentation are needed. For example, utilizing digital tools to enhance financial literacy and lower transaction costs could be one option. Additionally, the role of quasi-formal worker groups as program delivery partners remains an open question. While pension product adoption faces unique behavioral barriers due to their long-term nature, it may be possible to replicate experimental designs that have examined the adoption of shorter-term savings products and other social insurance programs such as health and index insurance (see Karlan et al., 2014; Badarinza et al., 2019; Torm and Oehme, 2024; Banerjee et al., 2024).

5 Conclusion

Despite the fact that workers often exhibit an imperfect understanding of pension rules, the recent theoretical and empirical literature examined in this article suggests that eco-

nomic incentives do matter for participation, at least among salaried workers. In particular, when the link between contributions and benefits is weakened, participation declines in terms of the frequency of participation (the extensive margin) and even more so in terms of the wages reported (the intensive margin). While these distortions may be offset by insurance gains from an overall welfare perspective, they indicate that pension rules must be designed carefully to minimize contribution avoidance and maximize pension revenue.

These conclusions rely on a body of research that still has gaps and remains too geographically concentrated. Many features of pension programs are yet to be thoroughly investigated theoretically or empirically in the context of LMICs, particularly in the design of the payout phase, the interactions between pensions and shorter-term social insurance, the conditions that allow labor informality within registered firms to emerge, or the extent to which contribution decisions are influenced by peers or social norms. The available evidence comes mostly from a few middle-income countries with higher administrative data availability: collecting longitudinal surveys linked with pension records in more varied contexts can help paint a more representative and nuanced picture.

In poorer, higher-informality countries, where self-employment is the norm, voluntary pension participation remains rare, despite recent efforts to adapt pension products to the economic constraints of these populations (Guven et al., 2021). This lack of success reflects a multiplicity of obstacles to participation, such as limited understanding of pension programs, high transaction costs and lack of trust in governments. Experiments testing these different barriers have become more common in recent years, but the impacts of such interventions remain small over all. Future studies may need to lift several barriers at once in comprehensive interventions. Experimental designs could be adapted from the literature on the adoption of shorter-term savings products,[20] or other social insurance programs such as health or index insurance.[21] Applying a more granular approach that recognizes the vast heterogeneity in informal sector workers can also help. Some informal workers have links to local administrations, have long-term relation-

[20] Reviewed in Karlan et al. (2014).

[21] see Torm and Oehme (2024) and Banerjee et al. (2024).

ships with large formal firms, or, increasingly, participate in online job platforms. Some have stable if modest incomes whereas others are too poor or vulnerable to engage in long-term savings. In combination with experiments, more descriptive research can help identify lower-hanging fruit in the quest to extend pension coverage.

To sum up, LMICs have scope to increase pension revenue among populations where extreme poverty has receded significantly over the past decades. Social pensions can provide much needed relief for the poor and vulnerable, but fiscal constraints will severely limit their coverage or their generosity outside upper-middle-income countries. In addition, the evidence covered in this paper shows that public benefits are imperfect substitutes for support by family members. They lead to some reduction in inter-vivos transfers, but generally do not crowd them out. In other words, non-pension strategies to cover longevity risk, including own savings, continued work and support through the family, will remain important complementary strategies for many older people in developing countries. Pension benefits can also profoundly reorganize old-age support systems, by allowing caregivers to resume labor market activities or increasing the bargaining power of elderly pension recipients within their household, and influence decisions over investments in children. Such spillover effects need to be more systematically explored so robust institutions can be designed to protect all in an aging world.

While this article is concerned with LMICs, many of the findings are relevant for rich economies, in which independent workers may easily hide part of their earnings. As this studies shows, participation is easiest to maintain in stable salaried jobs. With the "changing nature of work,"[22] careers are evolving to be more fragmented, with a larger share of platform and "gig" jobs, temporary work, and self-employment. Indeed, the question of social protection for the self-employed has gained prominence since the COVID-19 pandemic in OECD countries.[23] Lifting economic and non-economic barriers to pension participation may become a pressing challenge for all countries regardless of income in years to come.

[22] World Development Report 2019, World Bank.

[23] International Social Security Association (ISSA), February 9, 2024.

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