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Organizing Old Age Pensions for India's Informal Workers: A Case Study of a Sector-Driven Approach

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Abstract

About 88 percent of India's total labor force is composed of informal (officially labeled "unorganized") workers. As many as 388 million such workers lack old age income security by way of a pension system. The Atal Pension Yojana (APY) is the latest contributory, national-level old age pension scheme for unorganized workers, with an entry age of 18–40 years. In other words, all current unorganized workers above the age of 40 are excluded. How could a national pension system viably guarantee equal pension benefits to all current unorganized workers? This paper considers how such a system might work by offering a case study of a non-contributory pension scheme for building and other construction workers in Karnataka State, India. The results indicate that this state-level pension scheme, fully funded by sector-specific receipts, is financially viable and sustainable with high levels of coverage and adequacy. The robustness of these results is shown via sensitivity analyses of discount rates, inflation rates, and growth rates of specific purpose tax collections. Additional analyses outline the scenarios under which pension benefits could be extended to all informal workers in the sector studied.

Keywords: Informal sector workers, pensions, India, Atal Pension Yojana

JEL codes: H55, J18

Organizing Old Age Pensions for India's Informal Workers:
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1. Introduction

According to the Government of India's Unorganized Workers' Social Security Act, 2008, the "unorganized sector" encompasses small enterprises (with fewer than ten employees and an individual owner) and self-employed workers engaged in the production or sale of goods or services of any kind whatsoever. An "unorganized worker" is a home-based worker, a self-employed worker, a wage worker in the unorganized sector, or a worker in the organized sector who is not covered by the statutory social security benefits. These benefits include life and disability coverage, health and maternity benefits, and old age protection.

The literature on India's old age pension schemes focuses on organized workers (World Bank, 2007), unorganized sector workers (Government of India, 2006; Planning Commission, 2012), general government employees (Reserve Bank of India, 2003), defense personnel (Government of India, 2017), and civilians or general public (Narayana, 2014; Narayana, 2015). In general, these studies show that India's pension schemes are characterized by (i) full coverage for the general government and defense personnel; (ii) higher coverage for organized sector workers; (iii) negligible coverage for unorganized workers with unique income and non-income exclusionary clauses; and (d) non-universality for civilians.

The India Employment Report 2016 (Ghose, 2016) estimates that the unorganized sector comprised about 388 million workers or 88 percent of total workers in 2011–2012. Of these workers,70 percent were aged 18–40 years, 23 percent were 41–59 years, 4 percent were 60 years and above, and 3 percent were less than 18 years. The adequate provision of statutory social security benefits in general, and old age income security by way of a pension system in particular, to unorganized workers has been a major policy challenge in India. Current needs include (i) a social safety net available to all individuals, regardless of their work history (Agarwal et al., 2016); (ii) attention to the design and capacity of institutions that oversee and maintain pensions, especially where the public-private division of responsibility for provisioning and financing is yet to be decided (Bloom and Eggleston, 2014); and (iii) the viable and sustainable financing of social security systems.

This paper examines whether the sector-specific design and financing of a universal old age pension scheme for India's unorganized workers could address these needs. The sector chosen is

construction, and the target pension beneficiaries are building and other construction workers (BOCW). Officially, the government must notify all building and other construction works and workers, but the workers engaged in these works are unorganized. Welfare schemes (including an old age pension scheme) for these workers are formulated and implemented by state governments through state-level workers' welfare boards. At present, benefits of the welfare schemes are limited (or lacking) for the registered (or unregistered) workers of the boards. The main source of financing for welfare schemes is the official cess or special purpose tax on the cost of construction activities within a state. There are specific rules and institutional arrangements for implementation of the pension and other welfare schemes within each state. These features signify the importance of state-specific policies and experiences. However, the need for an old age pension scheme is important and urgent for all the unorganized (that is, both registered and unregistered) BOCW in the country. The Atal Pension Yojana (APY) is the latest national old age pension scheme for unorganized workers; it has an entry age of 18–40 years and defined contributions and benefits.[1] But the APY excludes all unorganized workers above the age of 40. In this context, the sector-specific design and financing of an old age pension system assumes special importance if it can ensure equal pension benefits of the APY to all unorganized workers (both registered and unregistered), now and in the future.

This paper focuses on an economic analysis of a financially viable and sustainable old age pension scheme for the entire group of unorganized BOCW (comprising both registered and unregistered workers) in Karnataka State, India. The main objective of this case study is to answer the following policy research questions: (i) What are the available old age pension schemes for unorganized workers, including BOCW? Is there complementarity or substitutability between the pension scheme for BOCW and others? If substitutable, why is a separate old age pension scheme required for BOCW? (ii) How can the current viability and future sustainability of a pension scheme for BOCW be best defined, measured, and assessed? (iii) What are the design parameters for a financially viable and sustainable pension scheme for BOCW? To our knowledge, no evidence-based answers to the above questions exist in India, except for an early

[1] There is a large international and national literature on the public sector's design/architecture and implementation of national pension systems comprising defined contribution and/or defined benefit plans. This pension literature includes the OECD countries (OECD, 2017), East and Southeast Asian countries (Park, 2012), the informal sector in Asian countries (MacKeller, 2009), and an India-specific study by Asher and Bali (2010). In addition, pension systems are discussed under the broader measures of social protection for Asian countries by Handayini and Babajanian (2012) and India by Srivastava (2013). This literature is not directly applicable here because this paper is less about defined benefit plans and more of a case study of proposed sector- and state-specific scheme in India.

study by John (2004) on the sustainability of an old age pension scheme for BOCW in Kerala State.[2] This paper seeks to fill this gap.

To answer the above questions, this paper (i) provides a critical review of available pension schemes for unorganized workers; (ii) estimates the size and age profiles of registered and unregistered BOCW; (iii) calculates benchmark pension assets; (iv) calculates the short- and long-term liability of pension coverage for registered and unregistered BOCW; and (iv) determines the financial viability and sustainability of the current pension scheme. Three strategies are explored to reduce the pension liability and pension deficit and to restore financial sustainability with the pension surplus: (i) co-contribution to the APY, (ii) an increase in the discount rate, and (iii) augmentation of the cess collection. There are three databases for the above analyses: (i) the Karnataka Building and Other Construction Workers Welfare Board (KBOCWWB or, in brief, the Board) for data on the registered workers, sources of receipts, and pattern of expenditure; (ii) the National Sample Survey (NSS) 68th Round (2011–2012) on the employment and unemployment situation in India; and (iii) the Census of India 2011. Data from the first database mentioned are unpublished and collected from the administrative sources of the Board.

The main result of this case study shows that the KBOCWWB's current pension scheme is financially viable in the short run if the pension liability is not adjusted for inflation. The scheme is sustainable over 10–25 years if the annual growth rate of cess collections is above 25 percent, the discount rate is 9 percent or higher, and the contribution of all workers who subscribe to the APY scheme is paid by the Board. Under this sustainability condition, the pension benefits can be extended to all current registered and unregistered BOCW on par with the APY. These results offer useful design parameters for a financially viable and sustainable universal old age pension scheme for all unorganized BOCW in Karnataka State. This approach and its implications are of general relevance and applicability for other states in India and also may be used to formulate a national policy on old age pensions for India's unorganized workers in general, and unorganized BOCW in particular.

[2]John's (2004) paper analyzes the pension liability for 7,203 registered workers as on April 1, 2002, for a monthly pension of Rs. 200 and at a discount rate of 8 percent. The calculated pension value for these workers was Rs. 0.1583 billion. In addition, pension costs were calculated for an estimated number of then 2,76,373 workers. The net present value (NPV) of aggregate pensions was equal to Rs. 6.1487 billion. Given the estimated NPV of resources (Rs. 3.3894 billion), the annual pension deficit was calculated at Rs. 0.3224 billion over a period of 15 years. These results indicated that the pension scheme was not financially sustainable for Kerala State.

To our knowledge, there are a few sector-specific welfare funds for unorganized workers in India. These include the (i) Mica Mines Labour Welfare Fund Act, 1946; (ii) Limestone and Dolomite Mines Labour Welfare Fund Act, 1972; (iii) Iron Ore, Manganese Ore and Chrome Ore Mines Labour Welfare Fund Act, 1976; (iv) Beedi Workers' Welfare Fund Act, 1976; and (v) Cine Workers' Welfare Fund Act, 1981. All these welfare funds are at the national level under the Ministry of Labour and Employment and financed by welfare cess as per the respective cess/fund acts. The major welfare schemes of all the above funds involve health, housing, education, and recreation. Most importantly, no pension scheme for workers is designed and implemented by the above welfare fund. The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996, is a notable exception because of its specific provisions for the establishment of a Building and Other Construction Workers Welfare Board at the state level and the introduction of a pension scheme as one of the welfare schemes. Thus, a systematic analysis of pensions for the BOCW in this paper may have useful lessons for other sectors' unorganized workers if such workers' associations/welfare boards would like to create a provision and plan a pension plan in future.

The rest of the paper is organized as follows. Section 2 outlines the institutional background and financing of the pension scheme and its comparability with other pension schemes. The size and age profile of the current BOCW are calculated in Section 3. Section 4 presents the framework, variables, and parameters for a calculation of pension assets and liabilities. Sections 5 and 6 summarize results and analyses of the scheme's financial viability and sustainability. Conclusions and implications are summarized in Section 7. A list of the acronyms and abbreviations used in this paper are provided in Appendix 1.

2. Institutional background of the pension scheme

The construction sector contributes to state-level economic growth with its share of state income or gross state domestic product (GSDP). The construction sector includes the public sector (comprising general government and public enterprises) and the private sector (households and private construction companies). Fig. 1 shows the share of the construction sector in Karnataka's GSDP (at current prices) from 1999–2000 through 2016–2017. Throughout, the share has been higher than 6 percent. In addition, the construction sector generates both skilled and unskilled employment opportunities. For instance, using the data on main workers, or those

who have worked for a major part of the reference period (i.e. six months or more), from the Census of India 2011 and a sample proportion of construction workers (usual principal status) from the NSS's 68th Round (2011–2012), the total number of BOCW is equal to 1.422 million or 6.08 percent of all workers in Karnataka. Or, Karnataka's BOCW compose about 3.66 percent of the nation's total workers.[3]

The KBOCWWB is a welfare board for the BOCW in Karnataka State, India. It was established by the Government of Karnataka on January 18, 2007. The Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996, and the Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) (Karnataka) Rules, 2006, are the legal frameworks for the design and implementation of the pension scheme and other welfare schemes. The board provides financial assistance for the registered BOCW under 11 welfare schemes related to (i) disability pension, (ii) old age pension, (iii) maternity benefits, and (iv) assistance for (a) purchase of (tools) instruments, (b) purchase or construction of a house, (c) funeral expenses, (d) education of workers' children, (e) medical expenses (in-patient care), (f) accidental death or permanent displacement (incapacitation), (g) medical expenses for treatment of major ailments, and (h) marriage expenses.[4] **Table 1** summarizes the eligibility criteria and nature and extent of benefits of these schemes. First, registration is mandatory to be a beneficiary of the welfare schemes, and the minimum required duration of the registration varies across the schemes. A notable exception is the accident benefit, which is given to both registered and unregistered workers, though the nature and size of the benefit differs between the two types of workers. Meanwhile, a minimum one-year registration is required to avail assistance for education, marriage, maternity, and purchase of tools; and a minimum of five years of registration is required for the pension scheme and house assistance. However, no minimum registration period is required for the accident, hospitalization, major ailment, funeral, and disability pension schemes. Third, all benefits are financial in nature and

[3]At the all-India level, total employment (based on the NSS criterion of the UPS (usual principal status) in the construction sector is equal to 43.50 million persons in 2011–2012 and about 82 percent of them belong to the unorganized sector (Ghose, 2016).

[4]Following the Government of India's Unorganized Social Security Act 2008, the Karnataka government framed the Unorganized Workers Social Security (Karnataka) Rules, 2009, and established the Karnataka State Unorganized Workers' Social Security Board on October 5, 2009. This board introduced a welfare scheme called the Karnataka State Private Commercial Vehicle Drivers Accident Benefit Scheme during 2012–2013. The full insurance premium of subscribers to this scheme is paid by the Karnataka government. The board has no other welfare schemes and no specific sources of income to finance any welfare scheme for the unorganized workers.

the duration of benefits differ by scheme. Relatively long-term benefits include those of the pension scheme, the disability pension scheme, and the education and housing assistance schemes. Fourth, the schemes differ by their applicability to registered workers and/or their household members. For instance, education assistance and funeral assistance are applicable to the household members of a registered worker. The benefits of marriage assistance are applicable to registered workers and/or their household members. Benefits of the rest of the schemes are meant exclusively for a registered worker. Fifth, eligibility conditions are different between the pension scheme and other welfare schemes. Of all the schemes, the pension scheme can be distinguished by the KBOCWWB's long-term commitment to finance it.

Overall, the above welfare schemes are consistent with the provisions of statutory social security benefits as per the Unorganized Social Security Act 2008 because they aim at protecting and improving workers' skills (e.g. health and education) and protecting them from adversity (e.g. contingencies like accident, death, disability, and old age insurance).

2.1. Salient features of the pension scheme studied

The KBOCWWB's current pension scheme was implemented in 2016–2017. The total number of beneficiaries was 416 persons in 2016–2017 (the benchmark year). The pension benefit per beneficiary per month is Rs. 1,000 (or about $16). This benefit is above the official poverty line for rural Karnataka and marginally below the poverty line for urban Karnataka.[5]

The pension scheme is (i) state and occupation specific; (ii) not contributed to by the registered workers or the union or state governments; (iii) applicable to workers who have completed 60 years of age, and have paid the membership fee as a registered BOCW for five years or more and until 60 years of age; (iv) non-discriminatory in the eligibility criteria or pension benefits by workers' location (rural/urban), social categories (e.g. scheduled caste/scheduled tribe/other backward caste), age (e.g. no higher pension at a higher age), sex (male, female, or transgender), income (e.g. below-poverty-line (BPL) or non-BPL household), and nature of notified works (i.e. all notified construction workers are identically treated irrespective of their risk differences or occupational health and safety hazards).

[5] This is based on the official poverty line (in terms of monthly per capita consumption expenditure), estimated by the Planning Commission (now, NITI Aayog) in 2011–2012 (Government of India, 2013). The poverty line for India (or Karnataka) is Rs. 816 (or Rs. 902) for rural areas and Rs. 1,000 (or Rs. 1,089) for urban areas. Further, using the unit-level data in NSS's 68th Round (2011–2012), the monthly per capita consumption expenditure of the bottom 25 percent of BOCW is equal to or less than Rs. 869. This is below the official poverty line of rural or urban Karnataka.

Karnataka's pension scheme for BOCW differs from that of other states with regard to its eligibility criteria and pension benefits. For instance, a registered worker over 60 years of age, and three years after the date of registration, is entitled to a pension of Rs. 2,000 per month in Punjab and Rs.3,000 per month in Delhi. Andhra Pradesh's pension scheme pays 50 percent of the contribution amount for the registered BOCW if the worker voluntarily opts for the APY. Most recently, Odisha State has offered a pension of Rs. 300 (or Rs. 500) per month to all the registered BOCW older than 60 (or 80) years and without a minimum period of registration. Telangana, the newest state in India, is yet to introduce a pension scheme for BOCW. These interstate differences imply flexibility in fixing eligibility criteria and pension benefits as per the policy decisions of the concerned state governments. Thus, a pension scheme for BOCW is a state-specific policy in India.

2.2. Financing of the pension scheme

The KBOCWWB's pension and other welfare schemes are to be exclusively funded by the welfare fund. This fund is the cumulative sum of all annual receipts of the Board. The receipts include the amount of cess collections, workers' contributions (i.e. registration and subscription and renewal fees), and interest income. As per the Government of India's Building & Other Construction Workers Welfare Cess Act 1996, a cess (or specific purpose tax) must be collected on construction activities from employers at1 percent of the cost of construction, excluding (i) the value of land; (ii) any compensation paid or payable to a worker or kin under the Workmen's Compensation Act, 1923; and (iii) individual residential house construction whose total cost does not exceed Rs. 1 million.[6] The registration fee is a one-time payment (Rs. 75 per worker) and the subscription and renewal fee is quarterly (Rs. 150 per worker). All the unspent receipts of the fund are kept in fixed deposits (FDs) and/or savings bank (SB) accounts of public sector commercial banks and their interest earnings are accounted for as interest incomes.[7] The fund is maintained and managed by the KBOCWWB at the state level. The fund is used to meet the expenditure of the welfare schemes, office and administrative expenses (including payment for wages and salary), and capital expenditure (e.g. purchase of land and construction of buildings).

[6]This Central Act took effect in Karnataka from January 18, 2007. In principle, this cess is not an indirect tax on any good or service and may not be subsumed in the recent introduction of the Goods and Service Tax.

[7]The KBOCWWB is registered as a Charitable Trust under Section 12A of the Indian Income Tax (IT) Act and is eligible to apply for tax exemption on interest income. Accordingly, all interest incomes are presumed to be non-taxable.

Since its inception, it has neither allocated nor earmarked funds for any specific welfare scheme including for the pension scheme.

2.3. Trends in receipts, expenditures, and utilization of the welfare fund

Table 2 shows the annual size and sources of receipts of the welfare fund from 2006–2007 to 2016–2017. Throughout, all receipts and expenditures of the fund are measured at current prices. Over this period, the size of the fund was Rs. 55.27 billion and the cess collections contributed 74.30 percent, the interest income from the fixed deposits 25.04 percent, SB accounts 0.28 percent, and registration and subscription and renewal fees 0.39 percent. Throughout, cess collections have been the biggest source for the welfare fund.[8] Of the total annual receipts, the share of interest income from fixed deposits increased from 1.76 percent in 2007–2008 to 21.49 percent in 2012–2013 and to 30.13 percent in 2016–2017. Except for the initial years (2006–2007 and 2007–2008), the share of the registration and subscription and renewal fees has remained less than 1 percent of total annual receipts.

Table 3 summarizes the expenditure patterns and utilization of the annual receipts and the welfare fund from 2006–2007 through 2016–2017. Total expenditure increased from Rs. 7.12 million in 2007–2008 to Rs. 126.49 million in 2012–2013 to Rs. 1,045.96 million in 2016–2017. Total expenditure comprises the capital expenditure, expenditure on the welfare schemes including the pension scheme, and administrative expenses. Though the shares of these expenditures in the welfare fund show remarkable changes annually, expenditure on welfare schemes comprises the largest share (58.28 percent). On the other hand, utilization of the annual receipts and the welfare fund for the welfare schemes has remained less than 10 percent. Surprisingly, overall utilization of the welfare fund is about 6 percent. Thus, over the period 2006–2007 to 2016–2017, about 94 percent of the welfare fund remained unutilized in the

[8] Building and other construction activities are undertaken by public and private sectors. Sources of cess from the public sector include the administrative/line departments and the departmental and non-departmental enterprises. Private sector sources include corporations and households. As per the notifications of the Karnataka government, the local authority, empowered to give approve building plans (or construction works) of owners/contractors/ builders etc., must collect the cess and remit it to the KBOCWWB within the financial year. Subsequently, the Board gives back 1 percent of the cess collections to the concerned local body toward the cost of cess collection. All cess collection figures in this paper are the net of payments to local bodies. The amount of cess transferred to the Board as a percentage of amount of cess collections is 100 percent up to 31st March 2017 (Appendix 2).

Board.[9] In fact, the unspent balance of the welfare fund is one of the main reasons for the remarkable growth of interest incomes.

Fig. 2 shows the share of aggregate expenditure (or benefits in value terms) and beneficiaries over the period 2007–2008 to 2016–2017 by welfare scheme. Of the welfare schemes, assistance to education dominates with about 40 percent of the aggregate expenditure and 86 percent of the aggregate beneficiaries. The next highest share is assistance with marriage (and funeral) expenses, which makes up about 9 (or 3) percent of the aggregate expenditure and 41(or 13) percent of the aggregate beneficiaries. The sum of these three expenditures accounts for 97 percent of the aggregate beneficiaries and 94 percent of the aggregate benefits. The pension scheme has less than a 0.22 percent share in the aggregate beneficiaries and 0.16 percent in the aggregate expenditure. No expenditure and beneficiaries are reported under the house assistance scheme.

Unlike the pension schemes, the beneficiaries of education, marriage, and funeral assistance include the household members of the registered workers. Assistance to education is utilized more often by workers' households than are benefits for marriages and funerals. Expenditure and beneficiaries of accident, hospitalization, major ailments, and disability pension are uncertain. These differences imply that the distribution of benefits and beneficiaries may not be strictly comparable across welfare schemes.

2.4. Comparability with other pension schemes

It is important to examine available old age pension schemes for civilians and unorganized workers to compare them in terms of complementarity or substitutability to the pension scheme for the BOCW in Karnataka. This pension scheme is a complement if it can be used along with other available pension schemes or a substitute if it can replace another pension scheme. The following pension schemes are considered for this comparative analysis.[10]

[9] Select inter-state comparisons on the cess collections and utilization are given in Appendix 2.

[10]This analysis excludes those pension plans that elderly individuals subscribe to on their own and that are linked to saving (or deposits) and investment (or annuity) schemes of commercial banks, post offices, insurance companies, and mutual funds. These plans include the (i) Prime Minister's Senior Citizens Plan (or Pradhanmantri Vaya Vandana Yojana*)* through the Life Insurance Corporation of India; (ii) Monthly Income Scheme and Senior Citizen Saving Scheme of the India Post; (iii) and the National Pension Scheme and All Citizen Model of the Pension Fund Regulatory and Development Authority. These pension schemes differ by their eligibility criteria for enrollment, investment caps, returns to investment, duration of locking period, and amount of guaranteed (or defined) pension benefits. These pension plans are open to all citizens including the unorganized BOCW and can be subscribed to along with other schemes including the pension scheme for the BOCW.

The Indira Gandhi National Old Age Pension Scheme (IGNOAPS) is a non-contributory (or social) pension scheme for individual civilians who are 60 years or above and belong to a below-poverty-line (BPL) family as identified by the Karnataka government. Since November19, 2007, the amount of monthly pension given by the Government of India per beneficiary is Rs. 200 for a person up to the age of 79 years and Rs. 500 for 80 years and above. A supplementary pension amount is paid to the IGNOAPS recipients by the Karnataka government: Rs. 300 for persons aged 65–79 years and Rs. 250 for those 80 years and above. As of May 15, 2017, the total number of IGNOAPS beneficiaries in Karnataka was 92,308, or 3.67 percent of the total beneficiaries in India (i.e. 24.29 million persons). However, the pension benefits under the IGNOAPS are less than those of the pension scheme for the BOCW, and their eligibility conditions are also different. Further, an elderly individual cannot avail the benefits of both the public schemes at the same time.

Sandhya Suraksha Yojana is an old age pension scheme set up by the Karnataka government, implemented since July 2, 2007, for individuals aged 65 years and above. The amount of monthly pension is Rs. 500 per month. The exclusionary clauses state that (i) the beneficiary couple's annual income should not exceed Rs. 20,000 per annum; (ii) their combined bank balance should not exceed Rs. 10,000; (iii) they should not be receiving s pension from any public or private sector organization; and (iv) the beneficiary must be a small or marginal farmer, fisherman, weaver, and worker in the unorganized sector (excluding BOCW who are beneficiaries of the KBOCWWB's pension scheme).

Atal Pension Yojana (APY) is a contributory pension scheme introduced on June1, 2015, and open to all workers in the unorganized sector in the age group 18–40 years. The defined pension benefit ranges from Rs. 1,000 to Rs. 5,000 depending on the workers' contribution. The Government of India's co-contribution was up to Rs. 1,000 per annum per subscriber for five years if he/she had joined the scheme from June1 to December 31, 2015. The scheme is targeted at those who (i) are not covered by any statutory social security scheme and (ii) are not income tax payers. In addition, the APY has provisions for life and accident insurance coverage. Total enrolment into the APY was 7.065 million persons in India by the end of March 2015, and Karnataka's share was 7.30 percent (0.516 million persons). This covered 2.03 percent of the total population in the age group 18–40 years in Karnataka as compared to 1.52 percent at the

national level. The KBOCWWB co-contributes to the APY up to Rs. 1,200 per registered worker per year. This implies a complementarity with the pension scheme for BOCW.

National Pension Scheme (NPS) Lite – Swavalamban – was a contributory pension scheme, introduced in 2010–2011 and open to all unorganized workers in the age group 18–60 years. It was implemented by the Karnataka Unorganized Social Security Board and regulated by the Pension Fund Regulatory and Development Authority. The Government of India's contribution was up to Rs. 1,000 and the Government of Karnataka's co-contribution was up to Rs. 2,400 per worker if he/she belonged to socially disadvantaged groups (e.g. scheduled castes or tribes) and Rs. 1,200 per worker if he/she belonged to other social groups. This scheme was closed on March 31, 2015, due to low coverage for reasons including lack of defined pension benefits at the age of 60 years. The subscribers of Swalalamban were given the option to shift to the APY (if their deposit capacity was less than Rs. 6,000 per annum), or to the NPS's All Citizens' Model (18–60 years), or close their accounts. In the meantime, there has been no direction from the Government of India on the payment of the employee's contribution to the All Citizen's Model by the KBOCWWB.

Overall, the KBOCWWB's pension scheme is not comparable by substitutability or complementarity with the available pension schemes by eligibility criteria and benefit amount. A notable exception is the APY. Section 6.2.1 below explores the implications of this exception on pension liability for the Board.

3. Number and age profile of BOCW

The total number of unorganized BOCW is equal to the sum of registered and unregistered BOCW. The number and age profile of these workers are calculated separately. This is essential for the calculation of the pension liability of these workers.

3.1. Registered workers

Up to March 2017, 1.11 million BOCW had registered with the KBOCWWB.[11] Digitized data are available for 47,968 workers who registered from February to November 2016 and 352 registered beneficiaries of the pension scheme. Using these digitized data, the age profile of the

[11] Select inter-state comparisons of the registered number of BOCW are given in Appendix 2.

total registered workers is calculated (**Fig.3)**. The profile shows a rise in the share of workers from age 19 (1.45 percent); this peaks at age 38 (3.73 percent), and starts declining at age 48 (2.44 percent). The share of workers at 59 years is equal to 0.09 percent (or 991 workers). Over the next 5 years, the number of current registered workers who move into the pensionable age will reach 22,988 and within 10 years this will be 100,703. These numbers are 55, and 242, times, respectively, the number enrolled today (416 persons). This matters for the calculation of the short- and long-term pension liability for registered workers. Of the registered workers, 27 percent are female and 49 percent belong to socially disadvantageous groups: 16.40 percent to scheduled castes, 5.41 percent to scheduled tribes, and 27.38 percent to other backward castes. Thus, the distribution of the pension and other welfare schemes benefits has implications for gender and social justice among the registered BOCW.

3.2. Unregistered workers

The decennial population Census of India and the quinquennial National Sample Survey (NSS) on the Employment and Unemployment Situation in India (EUSI) are official sources of data on the total BOCW at the national and state levels. The official definition of a construction worker and the coverage of construction activities differ between these sources. For instance, a construction worker is either a main or marginal worker in the Census of India 2011,[12] whereas the NSS 68th Round (2011–2012) distinguishes a construction worker by the usual principal activity status (UPS) and the usual subsidiary activity status (USS) in specified activities.[13] The definitions of a construction worker are different for registration with the KBOCWWB (i.e. a worker who is engaged in any building or construction activities for not less than 90 days in the preceding 12 months on the day of registration). Further, no registration status with the welfare boards is available for construction workers in the Census of India 2011 and the NSS 68th Round. In addition, the Census of India 2011 has not yet released data on marginal workers and construction workers. Thus, an accurate calculation of the total number of unregistered construction workers is not possible. Given the above data limitations, the total number of

[12] Marginal workers are those who have not worked for a major part of the reference period (i.e. worked less than six months).

[13] A person who has worked for a majority of the 365 days prior to the date of the survey is considered employed by the *usual principal activity status* (UPS). The *subsidiary economic activity status* (USS) is applied to a person who pursued some economic activity for 30 days or more during the reference period of 365 days preceding the date of the survey. All those with either UPS or USS are considered as being in the labor force.

unregistered workers is approximated using the following two methods. First, the total number of the BOCW is calculated as 14,22,549 persons by using (i) the total number of main workers from the Census of India 2011 (2,33,97,181 persons) and (ii) the sample proportion of construction workers based on the UPS from the NSS 68th Round (6.08 percent).[14] Second, at the all-India level, 10.60 percent of total workers are construction workers (i.e. the proportion of construction workers that fall within the UPS or USS). Applying this ratio to the NSS-based total estimated number of all workers (42,04,51,100 persons with UPS or USS), the total number of construction workers at the all-India level is equal to 4,45,67,817 persons. Applying Karnataka's share of the nation's total main workers in the Census of India 2011 (6.45 percent), the total number of BOCW in Karnataka is calculated as 28,76,063 persons. Subtracting the total number of registered workers from these estimates, the share of current unregistered BOCW varies between 22 to 62 percent of the total estimated BOCW in March 2017.[15] Lack of awareness of the benefits of registration and low financial literacy are key reasons for the low registration rate of BOCW in the state.

The age profiles of the estimated total number of BOCW with UPS (2.88 million) are listed in **Fig.4**. There are a limited number of sample observations regarding workers with USS. Unlike the age profile of the registered BOCW in Fig. 3, the age profile of the total BOCW in Fig. 4 is from age 14 through 75 years due to the inclusion of unregistered workers. The total number of BOCW at age 60 and above is equal to 1,02,963 and in the age group 55–59 years this is 1,19,644. Over the next five years, total pension beneficiaries would be 535 times bigger than today if the entire unregistered BOCW were to be included in the pension scheme. This has important implications for the calculation of the pension liability of these workers.

4. Calculation of pension asset and liability

The pension scheme is exclusively financed by the welfare fund and, hence, the fund's availability and sufficiency are essential conditions to match it with the pension liability and to determine the scheme's viability and sustainability.

[14] This percentage is close to the share of construction workers in Karnataka (6.48 percent) in the Census of India 2001.

[15] As per the NSS 68th Round (2011–2012), 97 percent of construction workers are non-recipients of these social security benefits in Karnataka. Thus, all the BOCW are considered unorganized workers in this paper.

4.1. Pension asset

Whether or not the available welfare fund is adequate can be determined by projecting the expenditure on the welfare schemes including the pension scheme. Given the focus of this paper on the pension scheme, and assuming that the KBOCWWB's requirements for non-pension welfare schemes are equal to the current rate of utilization of the welfare fund, the size of the pension asset is determined. As of March 31, 2017, the total size of the welfare fund was equal to Rs. 55.27 billion (Table 2) and the cumulative total expenditure was equal to Rs. 3.10 billion (Table 3). Hence, the size of the pension asset in the benchmark year was equal to Rs. 52.17 billion. Throughout, this value of the pension asset will be used for viability and sustainability analyses.

4.2. Pension expenditure and liability

Pension expenditure (the product of the number of pension beneficiaries and the pension benefits per beneficiary) and pension liability (in terms of the standard annuity factor and discount rate at 5 percent) are calculated for the current and future pensioners over the next five years (2016–2017 to 2020–2021) to evaluate the financial viability.[16] Pension liability is calculated in terms of the present value of the lifetime pension liability (PVP_j) for all current registered, unregistered, and total workers to evaluate sustainability. The standard and general framework for the calculation of PVP_j (e.g. in year 2016) is as follows (Giang, 2012):

$$PVP_j(2016) = \sum_{j=j^*}^{D} N_j B_j \sum_{i=2016}^{2016+D-j} S_{j,i}[(1/(1+r)^{(i-2016)}]_{(1)}$$

Where N_j is the number of pension beneficiaries; B_j is the pension benefit per beneficiary; S_j is the survival probability at age j; D is the number of years that pensioners are going to live; j* is the minimum age of the pensioners; and r is the discount rate. Thus, PVP_j is the present value of the pension liability during (D-j).

[16]India's official discount (or interest) rate is equal to the Reserve Bank of India's benchmark interest rate (medium-term inflation target ±2%). During 2017, this rate was around 5 percent. Alternatively, the 5 percent discount rate is equal to the minimum average deposit rates of savings and term deposits (>1 year maturity) in the third quarter of 2016–2017 (Reserve Bank of India, 2017).

The above framework for calculating the pension asset and liability are based on three strong assumptions. First, the framework does not include the growth of the pension in terms of benefits per beneficiary (Rs. 1,000 per month per person) because the current pension scheme has no provision for indexing with inflation. This does not mean the absence of an increase in pension expenditure or liability because they depend, among others, on the survival probability of registered current workers and the inclusion of current unregistered workers into the pension scheme. In fact, the inclusion of unregistered workers aims at an increase in the coverage of the pension scheme among the existing unorganized construction workers. However, this is not considered the growth of pensioners or total unorganized workers in the sector. Second, all current registered and unregistered workers will remain as BOCW throughout. This is essential for all calculations of viability and sustainability for the existing stock of workers in the sector. However, no survey or administrative data are available on the work history of current workers to relax this assumption. Third, utilization of the welfare fund for non-pension welfare schemes would remain at the current rate. This is essential for calculating the pension asset in the benchmark year.

4.3. Variables and parameters

The data required on the variables and parameters to calculate the pension expenditure and liability are the (i) number of pensioners by age, (ii) pension benefit per beneficiary, (iii) survival probability by age, (iv) life expectancy by age, and (v) discount rate. The number of pensioners is calculated using the age profiles of registered, unregistered, and total BOCW in Fig. 3 and Fig.4. The average pension benefit is equal to Rs. 1,000 per month per beneficiary. This is assumed to remain constant throughout. Different discount rates are assumed for viability and sustainability calculations. The SRS-Based Abridged Life Tables 2010–2014 (Government of India, 2016) are used to calculate the single-year, age-specific mortality rate; survival probability; and life expectancy in Karnataka.[17] The survival rate is not distinguished by male or female workers and rural or urban workers because the pension scheme does not discriminate these BOCW categories by the eligibility criteria and pension benefits.

[17]The Actuarial Association of India (i.e. the Institute of Actuaries of India) has prepared the Indian Assured Lives Mortality (2006–2008) and published the Mortality Table, effective April 1, 2013, with the concurrence of the Insurance Regulatory and Development Authority. This is a single-year, age-specific mortality rate constructed at the all-India level. It is not used for the analysis here because of a lack of updates and because it is not specific to Karnataka.

5. Financial viability of the pension scheme

The pension scheme is financially viable if the ratio of current pension expenditure or liability to current pension asset is less than 1. This ratio is called the viability ratio (VR), and VR<1 is the financial viability condition. A VR based on pension expenditure may underestimate the pension cost and lead to a myopic pension scheme. Thus, a comparison of implications of the pension expenditure and liability on the viability of the pension scheme is useful to the Board. All pension expenditure and liability for this viability analysis are adjusted to the survival probability of workers and distinguished with and without indexation for an annual inflation at 5 percent.[18]

Table 4 summarizes the financial viability results of the pension scheme by coverage of the registered and unregistered pension beneficiaries. The total pension liability for the registered current pensioners (416 persons) is Rs. 46.61 million without adjustment for inflation and increases to Rs. 101.54 million with adjustment for the inflation rate. Over the next five years, the number of registered current workers who move into pensionable age (60 years and above) is 22,988 and the combined pension liability on the current and future pension beneficiaries increases to Rs. 6,028.55 million if adjusted for inflation. This implies that the short-run pension liability may be expected to double from the current level. However, all the pension liabilities covering the registered current and future pensioners are financially viable (or VR<1). In contrast, the size of the pension expenditure is remarkably smaller for the registered current workers as well as for the registered current and future pension beneficiaries.

The viability of the pension scheme for unregistered workers is determined as follows. First, the estimated number of total BOCW includes workers aged 51–55 years, 56–59 years, and 60 years and above. As per the eligibility criteria for the pension scheme, among others, a minimum five years of registration with the KBOCWWB is essential. Accordingly, the current estimated number of workers in the age groups of 56–59 years and 60 years and above are not eligible for the pension scheme. Thus, over a period of the next five years, the pension liability is relevant for the current estimated number of BOCW at the age of 55 years. Second, the estimated total BOCW at age 55 years includes both registered and unregistered workers. We deduct the number of registered workers from this total by age and arrive at the estimated number of unregistered

[18]This rate is the official inflation rate (wholesale price index based) for the third quarter of 2016–2017 (Reserve Bank of India, 2017).

workers (40,453 persons). If registered, these workers would be eligible for the pension scheme in 2020–2021. Accordingly, an approximate pension liability and the expenditure of the unregistered current BOCW are calculated. The results are given in **Table 4**. The size of the pension liability and expenditure needed to cover the pension benefits of current unregistered workers at age 55 is higher than that of registered workers. For instance, the total pension liability (or expenditure) increases to Rs. 12,667.50 (or Rs. 591.50) million if adjusted for the inflation rate. However, the pension scheme with the inclusion of current unregistered BOCW at age 55 is financially viable (or VR<1).

At present, current unregistered BOCW above the age of 55 years will never be eligible to receive the pension scheme benefits. Their number, as per the age profile in Fig. 4, is equal to 28,761 persons in the age group 56–59 years and 1,02,963 persons at age 60 years and above. Assessment of their pension liability and expenditure is useful as a policy guide in case the Karnataka government intends to change the current eligibility criteria to accommodate them all in the pension scheme. The results are presented in the last row of Table 4. The calculated pension expenditure and liability is striking in terms of the size of funds required for implementing the pension scheme for unregistered current BOCW above 55 years. However, the pension scheme with the inclusion of the unregistered current BOCW above the age of 55 years is financially sustainable (VR<1).

In short, the pension scheme is viable for each of the four groups of pension beneficiaries. In addition, the pension scheme may cover all groups of pension beneficiaries if the pension liability is unadjusted for inflation. For instance, the combined pension liability for all four groups of beneficiaries in Table 4 is equal to Rs. 58,090.76 million if adjusted for inflation and the pension scheme is financially unviable (VR=1.1). By contrast, the pension scheme is viable for all beneficiaries whether or not the pension expenditure is adjusted for inflation. This result implies a myopic decision on the viability of the pension scheme because the pension liabilities are underestimated by the pension expenditure.

6. Financial sustainability of the pension scheme

The pension scheme is considered financially sustainable if the ratio of the present value (PV) of the lifetime pension liability to pension asset in the benchmark year is less than 1. This

ratio is called the sustainability ratio (SR) and SR<1 is the sustainability criterion of the pension scheme. The PV of alternative pension liability scenarios is calculated by using Eq. (1).

6.1. Sustainability of the current pension scheme

Sustainability of the current pension scheme is determined by assuming a discount rate (r) at 5 percent, with no changes in the size of the welfare fund and no adjustment for the inflation rate. Current BOCW are grouped under three age groups: 18–40 years, 41–59 years, and 60 years and above. The results of the pension liability and sustainability ratio are presented in **Table 5** with coverage of the registered, unregistered, and total BOCW. Columns (2) and (3) give the PV of pension liability for registered workers. The highest share of pension liability is in the age group 18–40 years, where the largest number of registered workers is concentrated. The total liability is about 2.33 times bigger than the pension asset, or more than a 233 percent increase in the current pension asset is required to cover current registered BOCW. On the other hand, the pension liability for unregistered workers in every age group is bigger than that of registered workers. The total pension liability for unregistered workers is 3.75 times bigger than the current pension asset. Further, the pension liability would be remarkably larger if the pension scheme were to be extended to all members of the BOCW, registered or not. That is 6.08 times larger than the current pension asset. In other words, an increase in the current pension asset of about 608 percent is required to implement the pension scheme for all BOCW in the state. Thus, the KBOCWWB's current pension scheme is not financially sustainable (SR>1) for current registered and/or unregistered BOCW in the state.

6.2. Strategies for attaining the sustainability of the pension scheme

Three economic strategies are explored to reduce the pension liability or pension deficit (i.e. pension asset – pension liabilities) and to attain the financial sustainability of the pension scheme: (i) co-contribution to the APY, (ii) an increase in the discount rate above 5 percent, and (iii) an increase in the welfare fund by assuming a higher annual growth rate of cess collections. These analyses are aimed at determining the efficacy of each strategy or a combination of strategies to attain sustainability.[19]

[19] Other options for a reduction of the pension liability include (i) reducing pension benefits; (ii) obtaining budgetary support from the state government; (iii) improving returns on welfare fund investments; (iv) augmenting cess collections by increasing the cess rate from the current 1 percent to 2 percent; and (v) increasing the pensionable age.

6.2.1. Co-contribution to the Atal Pension Yojana (APY)

An alternative to the current pension scheme is to consider a proposal to provide the benefits of the APY to registered BOCW. As explained earlier in Section 2.3, if registered workers were to subscribe to the APY, the Board could co-contribute up to Rs. 1,200 per worker per year in the age group 18–40 years to ensure pension benefits of Rs. 1,000 per month per worker from the age of 60 years on. The results are summarized in **Table 6**. The years of contribution and monthly contribution per worker differ by the worker's age of entry into the APY. These differences are given in columns (1)–(3) as per the APY guidelines by the Government of India (2015). The pension liability is distinguished by two scenarios. First, the Board pays the full contributions to all registered workers (18–40 years) who subscribe to the APY and, hence, there are no contributions by workers at any time. This is called the full contribution scenario. Second, the Board gives a partial contribution to all registered workers up to Rs. 1,200 per beneficiary per year and, hence, co-contributions vary by worker. This is called the partial contribution scenario. The pension liability of these two scenarios has unique implications for the sustainability of the pension scheme in Table 5.

Under the full contribution scenario, the PV of pension liability is equal to Rs. 8.27 billion for registered workers in the age group18–40 years (Table 6), which is about 15.8 percent of the pension asset. The value of the sustainability ratio is 0.158 and the pension scheme is financially sustainable for the age group 18–40 years. On the other hand, the pension liability for unregistered workers in the age group 18–40 years in this scenario is equal to Rs. 13.35 billion. These estimates of pension liability have important implications for the sustainability of the current pension scheme in Table 5. For instance, the full contribution scenario reduces the pension liability for registered workers in the age group 18–40 (i.e. Rs. 78.55 billion in Table 5) by 89 percent and by 90 percent for unregistered workers. This brings down the total pension liability to Rs. 51.25 billion or reduces the total pension liability by 42.16 percent for all registered BOCW in Table 5. Consequently, the sustainability ratio is reduced to 0.98 and the full contribution scenario is a cost-effective and sustainable way of implementing the current pension scheme for registered workers. In the same way, under the full contribution scenario, a reduction in the pension liability for all unregistered (or both unregistered and registered)

These options are not considered here because of their incompatibility with the existing institutional, legal, and legislative provisions of the pension scheme.

workers is equal to Rs. 81.97 billion (or Rs. 133.22 billion) in Table 5 and the resultant sustainability ratio is equal to 1.57 (or 2.55). Consequently, the full contribution scenario is financially unsustainable if only unregistered or all BOCW in all age groups are covered by the current pension scheme.

Under the partial contribution scenario, the beneficiary's co-contribution to the APY is nil up to the age of 28 years and rises from Rs. 72 at age 29 years to Rs. 2,292 at age 40 years. The PV of the pension liability is reduced to Rs. 5.11 billion for registered workers (Table 6), and the pension scheme is financially sustainable (SR=0.098<1) for the age group 18–40 years as well as for all age groups of registered workers (SR=0.92<1). In the same way, the reduction in pension liability for all age groups of the entire unregistered (or total) workers is equal to Rs. 77.09 billion (or Rs. 125.18 billion) in Table 5 and the resultant sustainability ratio is equal to 1.48 (or 2.40). Thus, the partial contribution scenario is financially unsustainable if only unregistered or all BOCW in all age groups are included in the current pension scheme.

A partial contribution scenario may not guarantee that all workers would subscribe to the APY. For instance, Mitchell and Mukherjee's (2016) interesting empirical study on demand for micro pensions in India with reference to the National Pension Scheme, Swavalamban, showed the willingness of survey respondents to contribute an average of Rs. 1,500 per year. This amount falls short of the annual amount of the beneficiary's co-contribution above the age of 38 years under the APY. Thus, the full contribution scenario is preferable to the partial contribution scenario for two specific reasons. First, it ensures a guaranteed pension of Rs. 1,000 at 60 years to all registered workers in the age group 18–40 years. Second, it is a cost-effective way of provisioning the pension benefits to registered workers as compared to the current pension scheme. However, attainment of financial sustainability for the full contribution scenario by coverage of the entire (registered and unregistered) BOCW is a policy imperative.

6.2.2. Sensitivity to discount rates

Other things being the same, the calculation of the PV of pension liability and the sustainability ratio are sensitive to the choice of discount rates. **Table 7** gives the sensitivity of sustainability of the pension scheme to a higher discount rate (7 percent and 9 percent). These higher rates reduce the size of the PV of the pension liability for the registered, unregistered, and

total BOCW.[20] The extent of these reductions is with reference to corresponding figures in the current pension scheme in Table 5. However, the pension scheme is financially unsustainable. These results imply that, other things being equal, a higher discount rate (i.e. above 5 percent used for the sustainability of the current pension scheme in Table 5) may not restore the sustainability of the pension scheme.

The sensitivity of the pension scheme's sustainability under the full contribution scenario and at a 9 percent discount rate is given in **Table 8**. The results clearly show that the pension scheme is sustainable for registered workers but not for unregistered or total workers. Thus, a further option is explored below of combining strategies to attain the scheme's sustainability.

6.2.3. Increase in pension asset

The sustainability of the pension scheme is sensitive to the assumed values of the welfare fund's growth rate by sources of receipts and the coverage of beneficiaries. If measures are taken to augment the welfare fund to reach the required pension liability levels, other things being equal, the resultant pension scheme can be financially sustainable with a zero pension surplus/deficit. A pension surplus (or deficit) arises if the pension asset is more (or less) than the pension liability.

The PV of the pension deficit/surplus is calculated by assuming different annual growth rates of cess collections, a 9 percent discount rate, and the full contribution scenario for the APY. The PV of cess collections is calculated at three annual growth rates: (i) the actual annual growth rate of cess collections from 2007–2008 to 2016–2017, at 35.18 percent; and assumed growth rates at (ii) 25 percent and (iii) 20 percent. Cess collections in 2016–2017 are the benchmark for these projections. Interest incomes and registration and renewal fees are not included in these calculations. This implies that an increase in the pension liability is exclusively funded by the growth of cess collections in the Welfare Fund. The results of these calculations are given in **Table 8**.

The PV of pension liability for registered workers can be financed and pension surplus can be generated within the next 10 (or 15) years if the annual growth rate of cess collections is at

[20]The 7 percent discount rate equals an annual yield on 10-year government securities for the third quarter of 2016–2017, and a 9 percent discount rate is equal to the lower limit of the Reserve Bank of India's base rate (or minimum lending rate for all loans) in the third quarter of 2016–2017 (Reserve Bank of India, 2017).

35.18 (or 25.00) percent. On the other hand, the PV of pension liability for the entire BOCW can be financed and pension surplus can be generated within the next 15 (or 20) years if the annual growth rate of cess collections is at 35.18 (or 25.00) percent. These results offer evidence of the sustainability of the pension scheme because the sustainability ratio is less than 1. However, if the annual growth rate of cess collections is 20 percent, the pension deficit will persist over the next 15 years for registered workers and beyond 25 years for all (registered and unregistered) BOCW. This is not a sustainable pension scheme for the Board.

Overall, the above results imply that the pension scheme is financially sustainable if the KBOCWWB implements the full contribution scenario under the APY, applies a 9 percent discount rate, and achieves an annual growth of cess collections above 25 percent. This sustainable pension scheme is applicable to BOCW comprising registered and unregistered workers. Thus, a combination of strategies is required to attain the financial sustainability of the pension scheme. At the same time, these strategies generate pension surplus which can be utilized for expenditure on the other welfare schemes.

6.2.4. Changes in aggregate expenditure on welfare schemes

In the presence of changes in aggregate expenditure on the non-pension welfare schemes, the robustness of results in Table 8 can be checked as follows. Current utilization of the welfare fund is 5.61 percent or Rs. 3.10 billion. About 16.82 percent of registered workers (1,86,035) are beneficiaries of the schemes and the total benefit of all welfare schemes is about Rs. 9,265 per beneficiary. If this benefit is extended to all registered and unregistered workers, the aggregate expenditure on other (or non-pension) welfare schemes as a percentage of the welfare fund in 2016–2017 would equal 18.54 percent for registered workers, 29.66 percent for unregistered workers, and 48.20 percent for the entire BOCW. Further, if the current aggregate expenditure is assumed to grow at 3 percent per annum, the PV (at a 9 percent discount rate) of the aggregate expenditure per year over 10 (or 15) years is Rs. 15.12 (or 17.53) billion. At a 10 percent growth of the aggregate expenditure, this expenditure rises to Rs. 29.19 (30.55) billion. These expenditures are within the pension surplus to be generated over the period, if the annual growth of cess collections is at 35.18 percent, as in Table 8. Thus, the sustainability options for the

current pension scheme provided in Table 8 are robust, even if the future growth of expenditure on the other welfare schemes is higher than their current utilization rate in the welfare fund.[21]

7. Conclusions and implications

This paper has analyzed a case study of the pension scheme for unorganized (comprising registered and unregistered) BOCW by the KBOCWWB in Karnataka State, India. Conclusions and policy implications are outlined as follows.

Of the estimated total BOCW (2.88 million) in Karnataka, between 38 and 78 percent are registered. There is scope and opportunity to register a larger share of currently unregistered BOCW by creating more awareness of pension benefits and other welfare schemes. In addition, financial literacy and inclusion should be strongly promoted among all BOCW to enable them to fully utilize the benefits of the welfare schemes.

The current beneficiaries of the pension scheme (416 persons) constitute 0.40 percent of the total estimated BOCW at age 60 years and above. Over the next 5 (or 10) years, other things being the same, the estimated total beneficiaries of the pension scheme would be 248 (or 535) times bigger than today's number. Thus, determining the financial viability and sustainability of the pension scheme is an important and urgent policy imperative for the KBOCWWB.

The pension scheme is unique in terms of sector, occupation and state specificities, eligibility conditions, extent of benefits, coverage of elderly population, financing by sector-specific cess, and utilization of the welfare fund resources within the sector. In view of these unique features, a separate old age pension scheme for BOCW is required and justifiable. No essential complementarity or substitutability is found between the pension schemes for BOCW and other pension schemes for unorganized workers. The APY is a notable exception because it is a complement to the pension scheme in general and a substitute for it in the case of the age group 18–40 years.

The pension scheme is financially viable over the next five years if pension benefits are unadjusted for the annual rate of inflation. The viability scenarios imply different rates of coverage of pension beneficiaries by registered and unregistered workers and a varying share of pension assets for non-pension welfare schemes**.** However, financial viability based on the

[21]In fact, projections of the other welfare expenditures may need separate models for disability, sickness, accidents and education. This is not attempted in this paper.

pension expenditure may be a myopic policy criterion because it underestimates the pension liability, especially if the pension benefits are to be adjusted for inflation.

Sustainability analyses show that the pension scheme is sensitive to the composition of BOCW by registration status (registered or unregistered) and by age group. The largest share of the pension liability is evident in the age group 18–40 years, where the largest number of registered workers is concentrated. An increase in the current pension asset of about 233 percent is required to meet the pension liability for all registered BOCW. If the pension benefits are extended to all BOCW, the sustainability ratio is equal to 6.08 or the PV of pension liability is 608 percent larger than the current pension asset. Thus, the current pension scheme is not sustainable. However, sustainability can be restored with the pension surplus if the KBOCWWB fully contributes to all workers who subscribe to the APY, chooses the discount rate of 9 percent, and achieves an annual growth of cess collections above 25 percent. This sustainable pension scheme is applicable for all BOCW comprising both registered and unregistered workers – that is, universal provisioning of the pension benefits by financing from within the sector. This has important implications for the livelihoods of beneficiaries because pension benefits are close to the current official poverty line at the state level. Given the current socioeconomic composition of BOCW, the pension scheme may have broader implications for social justice and gender.

Analyses in this paper show that the key design parameters of a viable and sustainable pension scheme are the annual growth rate of the welfare fund through receipts, discount rates, inflation rates, contributions to the APY, and coverage of beneficiaries (by registered and unregistered status). In particular, a full contribution to the APY by the Board is preferable for two specific reasons. First, it ensures the guaranteed pension of Rs. 1,000 at age 60 years to all current registered workers at all ages. Second, it is a cost-effective way of provisioning the pension benefits as compared to the current pension scheme of the Board. Further, the viability and sustainability analyses call for a policy to create a separate pension fund within the current and future resources of the welfare fund. The viability and sustainability ratios indicate the required financial resources for a pension fund. Under the existing institutional arrangement, a pension fund must be created and managed by the KBOCWWB. A change in the design parameters (e.g. minimum age of retirement, pension benefits, registration requirements, and coverage of beneficiaries) may require suitable amendments to the rules. The results of this paper

offer economic justifications and empirical bases to propose such amendments, now and in the future.

Subject to the comparability of socioeconomic structures and institutional arrangements, the results and implications of this paper are relevant and applicable for pension schemes for BOCW in other states, and for unorganized workers in other sectors of India – and elsewhere, in other developing countries where the sector-specific design and financing of pension schemes are being implemented. Such applications are useful to establish the generality of the results of this case study by offering either supporting or confronting evidence on the financial viability and sustainability of pension schemes for informal workers in general and construction workers in particular.

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Table 1
Current eligibility criteria and extent of benefits of welfare schemes for registered BOCW in Karnataka State, India.

Welfare scheme	Eligibility criteria	Benefit/Assistance
1. Pension scheme	• Completed 60 years of age • Paid registration/renewal fee for a continuous period of not less than five years and continued as a construction worker until the age of 60 years	Rs. 1,000 per month per beneficiary
2. Accident benefits	Registered worker: Immediately after registration	a) Rs. 30,000 in case of death b) Compensation for disablement depending on extent (%) of disability
	Unregistered worker	a) Rs. 20,000 in case of a serious injury b) Ex-gratia of Rs.10,000 to family in case of death/grievous injury
3. Education assistance	• Minimum one year from the date of registration to the date of application • Only for two children of a registered worker	Per student per year a) Rs. 3,000: 5th, 6th, and 7th standard b) Rs. 4,000: 8th and 9th standard c) Rs. 6,000: 10th standard d) Rs. 5,000: Passed in 1st year Pre-University Course (PUC) e) Rs. 6,000: Passed in 2nd PUC f) Rs. 5,000: Students in Industrial Training Institutes g) Rs. 6,000: Diploma students h) Rs. 5,000: Undergraduate students i) Rs. 20,000: Postgraduate students j) Rs. 20,000: Students pursuing Ph.D. degree k) For medical/engineering students: Reimbursement of government prescribed fee plus Rs. 2,000 for attendance allowance
4. Marriage assistance	• Minimum one year of registration to the date of application • Only for self or two dependent children	Rs. 50,000
5. Maternity benefits	• Minimum one year registration to the delivery of a child • Only for first and second deliveries	Rs. 15,000 per delivery

6. Hospitalization assistance	• Immediately after registration • Five or more days of hospitalization for any disease	Rs. 400 for first five days and Rs. 50 per day for remaining days [subject to a maximum Rs. 6,000]
7. Assistance for major ailments	• Immediately after registration • For specified/notified ailments by the KBOCWWB	Up to Rs. 200,000[subject to the Central Government Health Scheme rates]
8. House assistance	• Registered for a period of not less than 5 years • Have 15 years of service for superannuation • Owns a site in own or in spouse's name	• Subsidy up to Rs. 50,000 • Interest subsidy for loan Rs. 1.5 million, if the rate of interest is above 5 percent
9. Assistance for purchase of (tools) instruments	• Registered for a period of not less than one year • Within 55 years of age • One time during the entire membership period	Up to Rs. 5,000
10. Disability pension	• Immediately after registration • Partially disabled due to any disease or accident at worksite • Up to the age of 60 years	Ex-gratia: Rs. 200,000 Pension: Rs. 1,000 per month
11. Assistance to meet funeral expenses	• Immediately after registration • Death due to natural causes • Receivable by the nominee of a registered worker	Rs. 4,000 for funeral expenses Ex-gratia: Rs. 50,000 to the family

Source: Compiled by author from KBOCWWB at: http://www.karbwwb.com/(accessed on March 11, 2017). KBOCWWB is the Karnataka Building and Other Construction Workers Welfare Board.

Table 2
Size and sources of annual receipts to the KBOCWWB's welfare fund: 2006–2007 to 2016–2017.

Year	Total receipts (Rs. million)	Share of annual receipts by sources (%)			
		Cess collections	Interest on fixed deposits	Interest on savings account balance	Registration and subscription and renewal fees
2006–2007	10.06	0.000	0.000	0.000	100.00
2007–2008	459.93	96.048	1.761	0.017	2.174
2008–2009	1,562.96	98.922	1.073	0.005	0.000
2009–2010	2,514.02	90.519	9.480	NR	0.001
2010–2011	3,610.21	90.078	9.711	0.210	0.000
2011–2012	4,612.30	78.186	21.348	0.174	0.292
2012–2013	6,227.06	77.658	21.485	0.496	0.362
2013–2014	6,863.38	70.063	28.959	0.089	0.889
2014–2015	9,695.20	67.669	31.666	0.078	0.588
2015–2016	9,233.71	70.558	29.127	0.245	0.070
2016–2017	10,482.89	68.897	30.128	0.663	0.312
Welfare Fund	55,271.72	74.295	25.043	0.276	0.386

Note: NR refers to not reported. KBOCWWB is the Karnataka Building and Other Construction Workers Welfare Board.
Source: Author's calculations.

Table 3

Size and sources of annual expenditure and utilization of total receipts of the KBOCWWB's welfare fund: 2006–2007 to 2016–2017.

Year	Total expenditure (Rs. million)	Share of expenditure by sources (%)			Utilization of total receipts by sources (%)			
		Expenditure on welfare schemes	Administrative expenditure	Capital expenditure	Expenditure on welfare schemes	Administrative expenditure	Capital expenditure	Total
2006–2007	0.82	0.00	9.17	90.83	0.00	0.74	7.37	8.12
2007–2008	7.12	4.69	68.67	26.64	0.07	1.06	0.41	1.55
2008–2009	18.22	7.20	65.76	27.03	0.08	0.77	0.32	1.17
2009–2010	30.53	11.75	85.43	2.82	0.14	1.04	0.03	1.21
2010–2011	70.33	15.63	36.85	47.53	0.30	0.72	0.93	1.95
2011–2012	86.05	33.85	33.83	32.31	0.63	0.63	0.60	1.87
2012–2013	126.49	38.04	35.27	26.69	0.77	0.72	0.54	2.03
2013–2014	776.34	9.52	5.25	85.23	1.08	0.59	9.64	11.31
2014–2015	272.40	61.68	33.02	5.29	1.73	0.93	0.15	2.81
2015–2016	667.48	80.50	12.56	6.95	5.82	0.91	0.50	7.23
2016–2017	1,045.96	89.37	8.39	2.24	8.92	0.84	0.22	9.98
Total	3,101.75	58.28	14.34	27.38	3.27	0.81	1.54	5.61

Source: Author's calculations.

Table 4
Pension expenditure on the pension scheme for BOCW in Karnataka State, India: 2020–2021.

Pension beneficiaries	Pension liability and expenditure (Rs. million)		Inflation-adjusted pension liability and expenditure (Rs. million)	
	Liability	Expenditure	Liability	Expenditure
(1) Registered current pensioners	46.61 (0.001)	24.42 (0.0005)	101.54 (0.002)	28.34 (0.0006)
(2) Registered current and future pensioners	2,779.17 (0.053)	278.82(0.0053)	6,028.55 (0.116)	335.91(0.0064)
(3) Unregistered current BOCW at age 55 years	5,405.56 (0.102)	463.46 (0.009)	12,667.50 (0.243)	591.50(0.011)
(3) Unregistered current BOCW above age 55 years	19,511.14 (0.374)	8,713.9 (0.167)	39,293.17 (0.753)	10,213.3(0.196)
All beneficiaries	27,742.48 (0.53)	9,480.60 (0.18)	58,090.76 (1.11)	11,169.05 (0.214)

Notes: (a) Inflation rate is assumed at 5 percent per annum. (b) Figures in parentheses refer to the viability ratio.
Source: Author's calculations.

Table 5
Sustainability of the KBOCWWB's pension scheme for BOCW in Karnataka State, India: 2016–2017.

Age group	Registered BOCW		Unregistered BOCW		Total BOCW	
	PV of pension liability (Rs. billion)	Percent share to total pension liability	PV of pension liability (Rs. billion)	Percent share to total pension liability	PV of pension liability (Rs. billion)	Percent share to total pension liability
18–40 years	78.55	64.63	138.00	70.56	216.55	68.29
41–59 years	42.93	35.33	53.993	21.95	96.93	27.08
60 years and above	0.049	0.04	14.65	7.49	14.69	4.63
Total	12.15	100.00	195.58	100.00	317.11	100.00
Sustainability ratio						
18–40 years	1.51		2.65		4.15	
41–59 years	0.82		1.04		1.86	
60 years and above	0.001		0.28		0.28	
Total	2.33		3.75		6.08	

Source: Author's calculations based on equation (1).

Table 6

Contribution to the Atal Pension Yojana and pension liability for the KBOCWWB: 2016–2017.

Age of entry	Years of contribution	Monthly contribution (Rs. per worker)	Estimated number of registered workers	PV of pension liability (Rs. million)	
				Full contribution scenario	Partial contribution scenario
18	42	42	22,379	61.00	61.00
19	41	46	15,114	46.20	46.20
20	40	50	19,972	68.00	68.00
21	39	54	20,861	78.50	78.50
22	38	59	23,918	100.60	100.60
23	37	64	24,720	115.30	115.30
24	36	70	26,325	137.20	137.20
25	35	76	26,043	150.50	150.50
26	34	82	28,190	179.20	179.20
27	33	90	28,906	205.50	205.50
28	32	97	33,026	257.70	257.70
29	31	106	30,749	266.60	251.50
30	30	116	35,498	342.30	295.00
31	29	126	34,652	368.30	292.30
32	28	138	37,471	442.20	320.40
33	27	151	38,078	497.80	329.60
34	26	165	35,476	512.30	310.50
35	25	181	35,975	575.30	317.80
36	24	198	37,579	662.60	334.60
37	23	218	31,313	611.60	280.50
38	22	240	38,750	836.70	348.60
39	21	264	32,440	772.10	292.50
40	20	291	37,319	978.90	336.40
Total			6,94,754	8,266.40	5,109.70

Note: PV is calculated by assuming the discount rate at 5 percent. KBOCWWB is the Karnataka Building and Other Construction Workers Welfare Board.
Source: Author's calculations based on equation (1).

Table 7

Sensitivity of pension liability and sustainability of the current pension scheme to discount rates: 2016–2017.

Age group	Registered BOCW		Unregistered BOCW		Total BOCW	
	Pension liability at 7 (9) percent discount rate (Rs. billion)	Reduction in pension liability (%)	Pension liability at 7 (9) percent discount rate (Rs. billion)	Reduction in pension liability (%)	Pension liability at 7 (9) percent discount rate (Rs. billion)	Reduction in pension liability (%)
18–40 years	69.83 (62.51)	-11.10 (-25.66)	114.05 (93.94)	-17.35 (-46.90)	183.88 (156.45)	-15.08 (-38.41)
41–59 years	37.65 (33.30)	-12.32 (-28.94)	41.91 (31.99)	-22.39 (-68.77)	79.55 (65.29)	-17.93 (-48.46)
60 years and above	0.04 (0.04)	-13.93 (-33.70)	12.49 (10.79)	-14.71 (-35.70)	12.53 (10.83)	-14.71 (-35.69)
Total	107.52(95.85)	-11.53 (-26.80)	168.45 (136.73)	-13.87 (-32.45)	275.97 (232.57)	-12.07 (-30.22)
Sustainability ratio						
18–40 years	1.32 (1.20)		2.19 (1.80)		3.52 (3.00)	
41–59 years	0.72 (0.64)		0.80 (0.61)		1.52 (1.25)	
60 years and above	0.001(0.001)		0.24 (0.21)		0.24 (0.21)	
Total	2.06 (1.84)		3.23 (2.62)		5.29 (4.46)	

Source: Author's calculations based on equation (1).

Table 8

Sustainability of the pension scheme under a full contribution scenario to the APY, discount rate at 9 percent, and assumed growth rates of cess collections.

Age groups	PV of pension liability (Rs. billion)			PV of cess collections (Rs. billion)			
	Registered	Unregistered	Total	10 years	15 years	20 years	25 years
18–40 years (APY)	3.1619	8.1999	11.3618	Annual growth rate of cess collections: 35.18			
41–59 years	33.2974	31.9922	65.2896	57.3159	168.1530	493.3265	1447.3187
60 years and above	0.0365	10.7933	10.8298	Annual growth rate of cess collections: 25%			
Total (Sustainability ratio)	36.4958 (0.70)	50.9854 (0.98)	87.4812 (1.68)	26.1969	51.9599	103.0590	204.4106
Financially sustainable options (Sustainability Ratio < 1)				Annual growth rate of cess collections: 20%			
				17.4166	28.1668	45.5523	73.6689

Workers	Options by growth rate of cess	Annual pension surplus (Rs. billion)
Registered	35.18%: 10 years	2.0820
	25%: 15 years	1.0309
	20%: 20 years	0.4528
Total	35.18%: 15 years	5.3781
	25%: 20 years	0.7789

Source: Author's calculations based on equation (1).

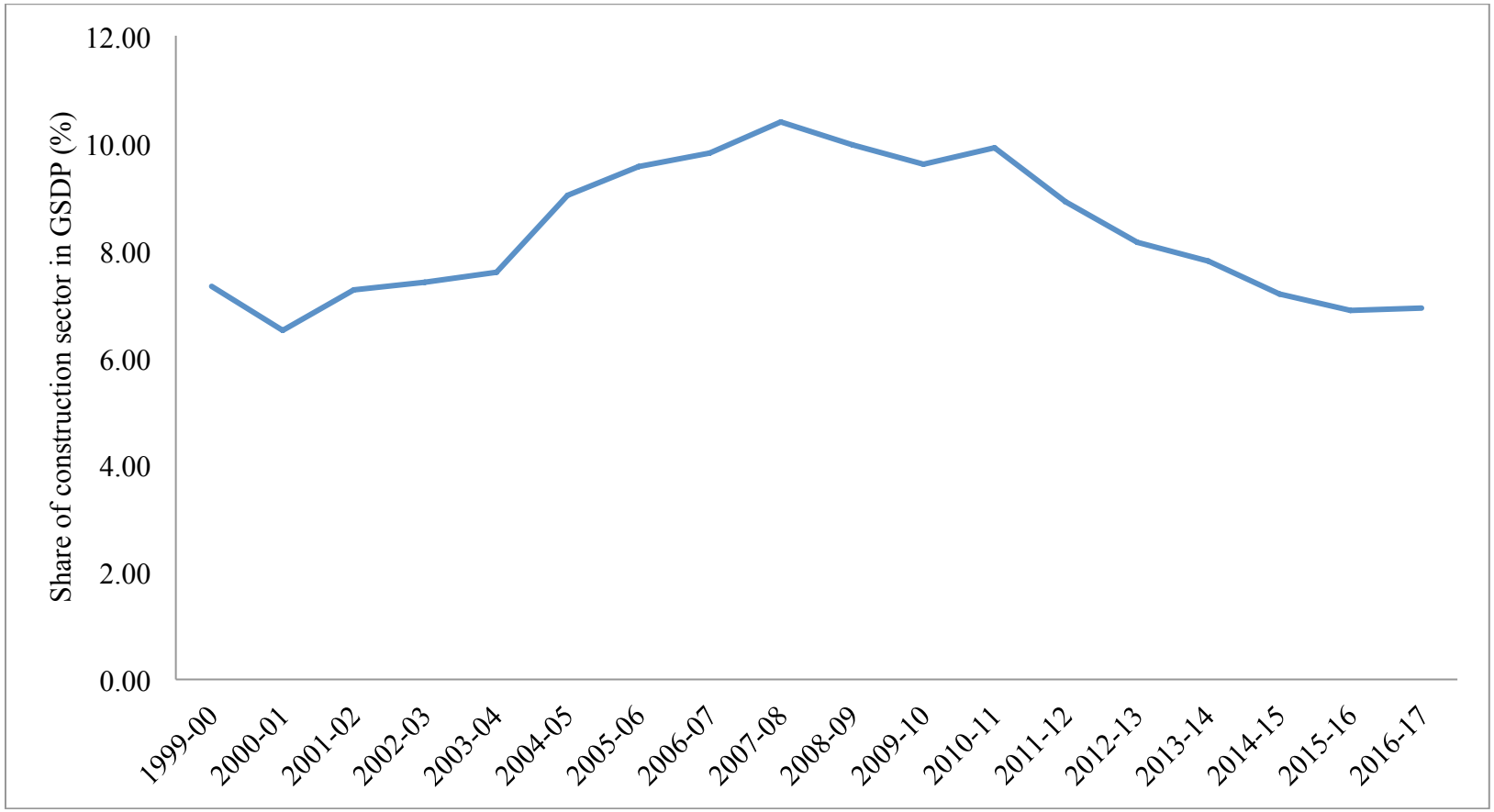

Fig. 1. Contribution of construction sector to Karnataka State's economic growth: 1999–2000 to 2016–2017.
Source: Author's calculation based on State Income data in Economic Survey of Government of Karnataka – various years.

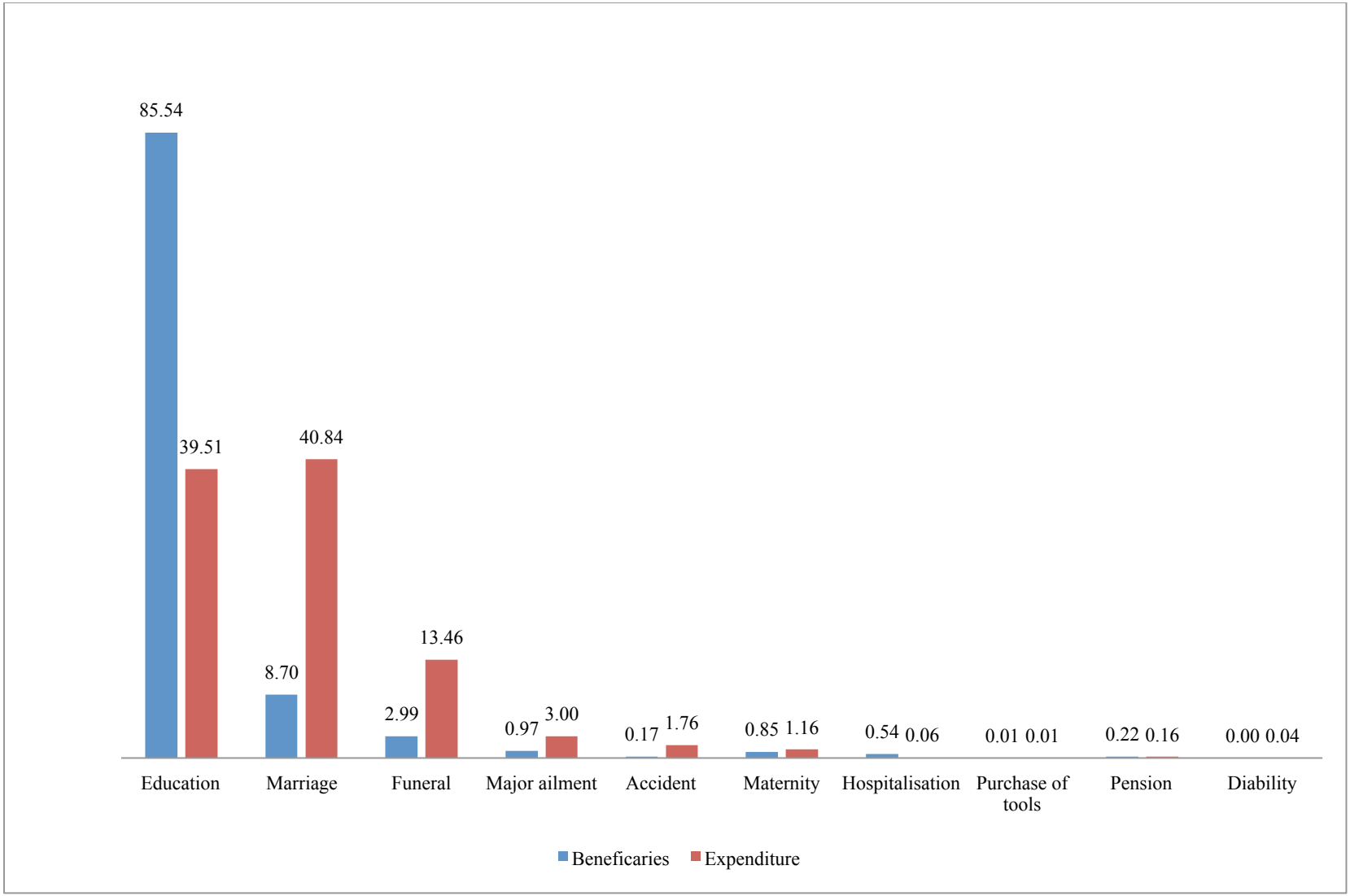

Fig. 2. Distribution of expenditure and beneficiaries by welfare schemes: 2006–2007 to 2016–2017.
Source: Author's calculation based on basic data of registered construction workers in the KBOCWWB.

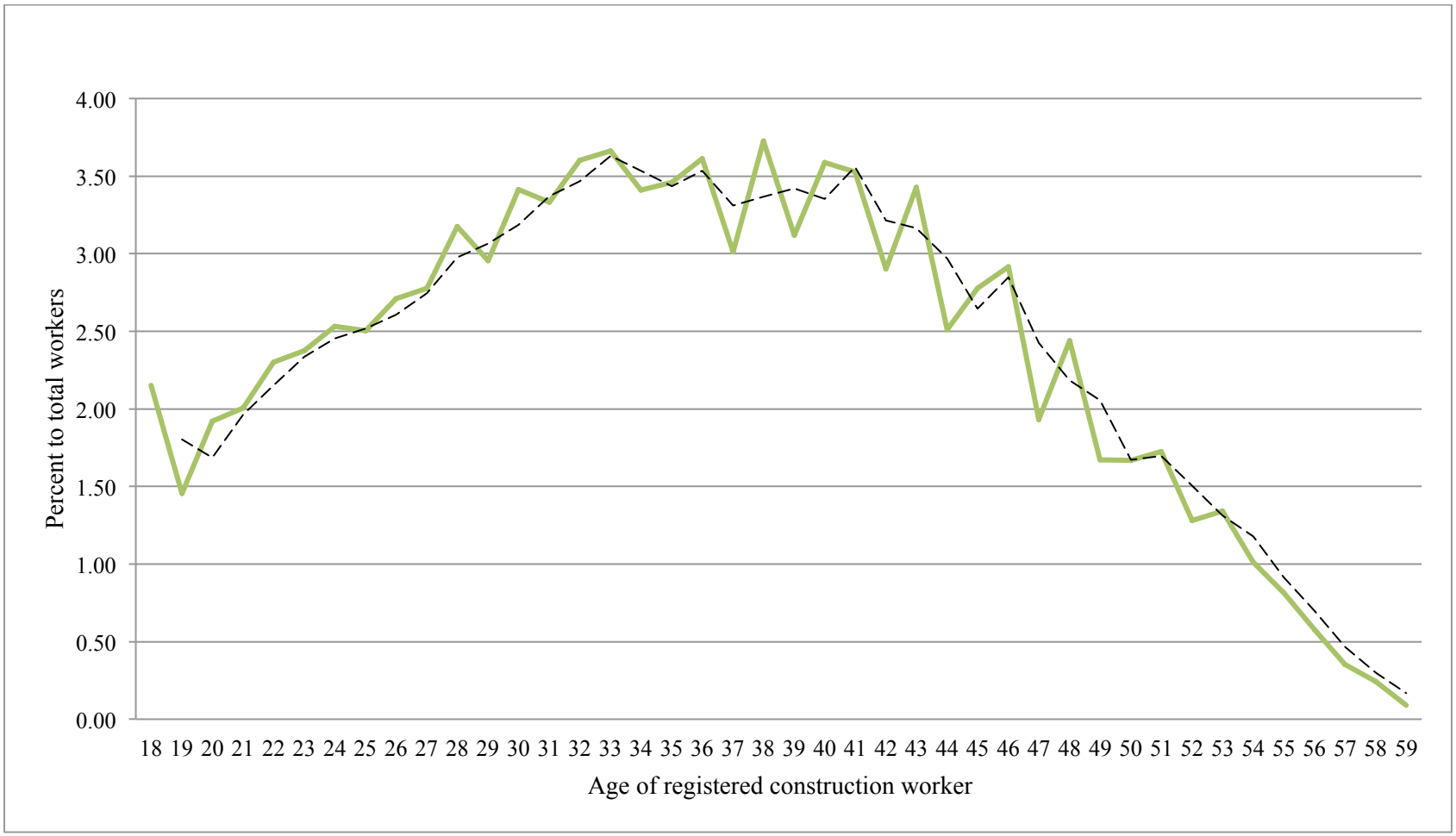

Fig. 3. Age profile of registered construction workers in Karnataka, March 2017.
Note: Dashed line shows the smoothed age profile by moving average (2 years) method.
Source: Author's calculation based on the individual-level data of registered construction workers in the KBOCWWB.

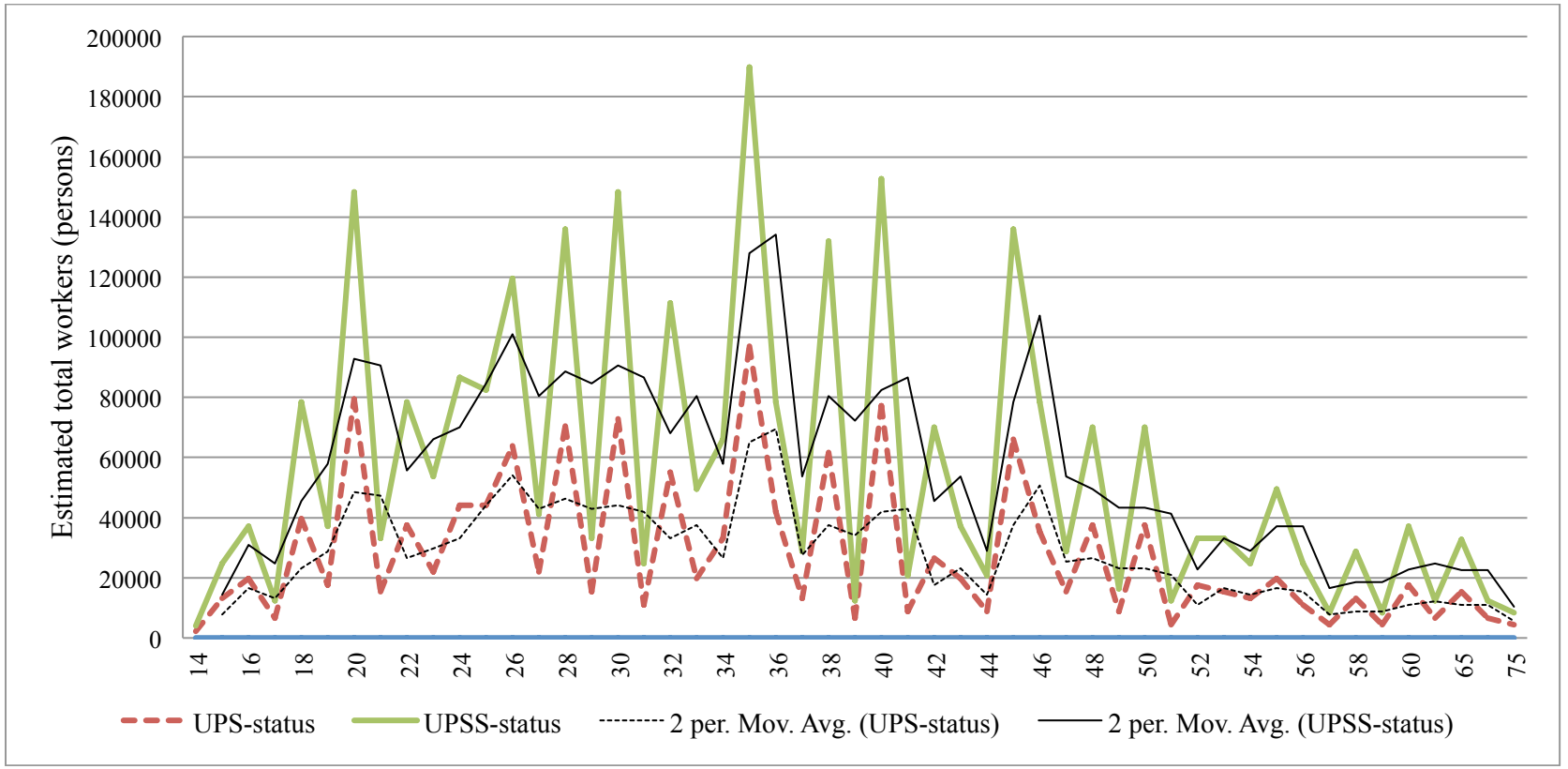

Fig. 4. Age profile of estimated total BOCW in Karnataka: 2011–2012.
Source: Author's calculation based on the unit-level data on construction workers in the NSS 68th Round (2011–2012).

Appendix 1

List of acronyms/abbreviations

APY	Atal Pension Yojana
BOCW	building and other construction workers
BPL	below poverty line
FD	fixed deposit
KBOCWWB	Karnataka Building and Other Construction Workers Welfare Board
IGNOAPS	Indira Gandhi National Old Age Pension Scheme
NITI	National Institution for Transforming India
NPS	National Pension Scheme
NSS	National Sample Survey
NSSO	National Sample Survey Organization
PV	present value
PVP	present value of pension liability
Rs.	Indian rupee
UPS	usual principal status
USS	usual subsidiary status
SB	savings bank
SR	Sustainability Ratio
VR	Viability Ratio

APPENDIX 2

INTER-STATE COMPARISON OF REGISTERED NUMBER OF WORKERS AND CESS COLLECTIONS AND UTILISATION

The purpose of this annexure is to describe the inter-state differences in the registered number of BOCW, amount of cess collections and utilization rate of cess collections from the year of establishment of welfare boards to 31st December 2015. **Table A2** summarizes these differences. It includes 22 states which had more than Rs.1billion total cess collections during the period. Rest of the states and Union Territories (UT) are combined together and called Other States and UT. Descriptions are focused on the position of Karnataka State among the states in India.

The earliest welfare board was established in Kerala (1998) and later by Haryana (2002), Madhya Pradesh (2003), Gujarath (2004) and Delhi (2006). The latest welfare board is established in Telangana (2014). The KBOCWWB, established in 2007, is neither the newest nor the oldest welfare board in India. Of the 21.54 million registered workers in India, Karnataka's share was 4.38 percent which was lower than 8 other states: Andhra Pradesh (7.17 percent), Chattisgarh (4.67 percent), Kerala (7.29 percent), Madhya Pradesh (12.32 percent), Odisha (5.53 percent), Tamil Nadu (11.80 percent), Uttar Pradesh (10.69 percent) and West Bengal (12.03 percent). Overall, Karnataka occupied 8th rank in terms of national share of number of registered BOCW.

Of the total cess collections (Rs.254.77 billion), Maharashtra had the highest share (14.05 percent) and Karnataka's share was second highest (12.45 percent). Of the total welfare expenditures (Rs.53.72 billion), Karnataka's share was 2.94 percent. This ranks Karnataka at the 12th position. The mismatch between the total cess collections and total welfare expenditure was evident by the utilization rate of cess collections (i.e. ratio of total welfare

expenditure to total cess collections). For instance, Karnataka's utilization rate (4.98 percent) was third lowest in the country and far below the national average (21.08 percent).[22]

In terms of average cess collections per year (i.e. total cess collections as on 31 December 2015 divided by number of years since the establishment of the welfare board), Karnataka's performance (Rs.3520 million) ranks 4th among the states. Further, in terms of cess collections per registered worker (Rs.33591), Karnataka ranks 5th among the States and above the national average (Rs.11823). Overall, Karnataka fares better by indicators of cess collections but not by indicators of cess utilization. An important administrative reason for low utilization rate in few states, but not in Karnataka, is attributable for a mismatch between the amount of cess collections by the administrative departments and amount of cess transferred to the welfare boards. For instance, Annexure I in Supreme Count of India (2018) gives data on the amount of cess collected and transferred to the welfare boards from 1996 to 31st March 2017. In case of Karnataka State, amount of cess transferred as a percentage of the cess collected is equal to 99.99 percent. This is in contrast with other states, such as, Arunachal Pradesh (20.34 percent), Kerala (29.62 percent), Gujarat (56.62 percent) and Uttar Pradesh (83.45 percent).

The low of utilization of huge cess collections have lead the workers' unions (i.e. National Campaign Committee for Central Legislation on Construction Labour) to seek a legal solution by filing a writ petition in the Supreme Court of India. A judgment on this petition on 19th March 2018 observed, among others, the following. *The Union of India must take a decision on the management of the cess already collected. It appears to us that the benefits and entitlements that have accrued to the construction workers (millions of whom have not been identified) cannot be passed on to them due to the passage of time, with the whereabouts of some of them not known. Accordingly, a decision will have to be taken by the Union of India on the gainful utilization of the cess already collected so that the Welfare Boards are not unjustly enriched – the beneficiaries having unfortunately lost out.* (Supreme Count of India, 2018: Para 79). Consequently, higher utilization of cess collections on the welfare schemes (including the pension scheme) may be expected in all states, including Karnataka, in near future.

[22] At the national level, the simple correlation coefficient between the cess collections and expenditure on welfare schemes is 0.223 and between the cess collections and utilization rate is -0.239.

Table A2: Cess collections and utilization rate of welfare boards for BOCW in India: 31 December 2015.

State	Share of registered workers (%)	Share of cess collections (%)	Share of expenditure on welfare schemes (%)	Cess utilization rate (%)	Average annual cess collections per year (Rs. million)	Cess collections per registered worker (Rs)
1. Andhra Pradesh (2007)	7.17	4.39	3.30	15.87	1240	7231
2. Assam (2008)	0.10	0.80	0.03	0.89	260	98129
3. Bihar (2008)	3.17	2.62	1.33	10.68	840	9785
4. Chattisgarh (2008)	4.67	2.12	6.43	64.06	670	5357
5. Gujarat (2004)	1.00	4.28	0.37	1.82	910	50712
6. Haryana (2002)	2.02	0.08	2.13	7.56	1080	34830
7. Himachal Pradesh (2009)	0.41	1.10	0.46	8.82	400	32024
8. Jammu & Kashmir (2007)	1.31	0.67	2.79	87.66	190	6029
9. Jharkhand (2008)	1.96	0.92	1.62	37.08	290	5539
10. Karnataka (2007)	4.38	12.45	2.94	4.98	3520	33591
11. Kerala (1998)	7.29	4.84	21.45	93.39	690	7858
12. Madhya Pradesh (2003)	12.32	6.18	10.28	35.04	1210	5939
13. Maharashtra (2011)	2.00	14.05	3.98	5.98	7160	83216
14. Odisha (2008)	5.53	3.50	6.50	39.10	1120	7493
15. Punjab (2009)	3.66	4.39	2.20	10.56	1600	14166
16. Rajasthan (2009)	1.79	2.88	4.73	34.63	1050	19020
17. Tamil Nadu (2003)	11.80	5.07	9.53	39.65	990	5081
18. Telangana (2014)	3.55	0.91	0.73	17.02	1160	3018
19. Tripura (2007)	0.29	0.43	0.14	6.72	120	17181
20. Uttar Pradesh (2011)	10.69	8.47	5.35	13.33	4320	9374
21. West Bengal (2008)	12.03	4.91	8.59	36.89	1560	4831
22. Delhi (2006)	1.47	6.03	3.25	11.37	1540	48475
23. Other States & UT	1.39	8.91	1.87	12.93	NA	26000
Total	100.00 (21.54 million persons)	100.00 (Rs. 254.77 billion)	100.00 (Rs. 53.72 billion)	21.08	NA	11828

Note: (a) Figures in parentheses refer to year of establishment of BOCW welfare board in the respective states.
(b) NA refers to not applicable.
Source: Narayana (2017)