Employment Generation in Urban India through PMAY(U)

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Abstract

To address the problem of housing shortage in urban India, the government approved a massive national housing scheme "Pradhan Mantri Awas Yojana-Urban" (PMAY-U) in June 2015. The scheme aims to construct about one crore affordable houses in the urban areas with a slogan 'Housing for All by 2022'. This paper attempts to understand the impact of the PMAY(U) scheme on the overall employment generation (both through direct and indirect channels). The study uses Detailed Project Reports for hills and plains as well as the Analysis of Rates, 2018 to estimate the direct employment generation and Input-Output Analysis for an indirect employment estimate. The overall employment generation is estimated considering the number of houses grounded (both completed as well as under construction) in all four verticals of the scheme. The analysis based on secondary data reveals that the PMAY(U) programme has made a significant impact on employment generation in the economy with important implications for household welfare and overall economic growth of the country.

Keywords: PMAY(U), Urban Housing, Employment, Input-Output Analysis

1. Introduction

India started trending in the global arena for its buoyant and rapid growth of gross domestic product (GDP) during the Tenth Five Year Plan (2002-2007)[1]. However, this growth in GDP lacked inclusivity in its growth process which brought up major issues such as unemployment, poverty, and inequality during the same period. While the Eleventh Five Year Plan (2007-2012) introduced 'inclusive growth' as a primary goal, the same was prolonged and remained in focus during the Twelfth Five Year Plan (2012-2017). According to the United Nations Development Programme's (UNDP) perspectives on inclusive growth, reliance on all sections of society should be part of the growth process. To promote inclusive growth, the government should intervene by implementing various micro and macro-level public programmes, including employment generation, infrastructure development, improved access to quality education and healthcare.

The current economic slowdown again, raises questions around major challenges relating to employment generation, specifically why the Indian economy has not been faster in generating

[1]*GDP grew at record of an average growth of 7.7 per cent in the Tenth Five Year Plan, the highest in the Plan period so far. See: http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11_v1/11v1_ch1.pdf*

more productive jobs[2]. On the other hand, the increased population size and significant shifts in migration from rural to urban have worsened the housing situation in urban India where large numbers population do not have proper housing with basic amenities. Often the urban poor live in over-crowded housing, self-made temporary structures in slums, and squatter settlements, exerting pressure on the deteriorating urban infrastructure and social services (Diogu, 2002; Olotuah & Bobadoye, 2009). These together are making the standard of living of the urban poor vulnerable and a special focus is needed towards providing affordable housing to this section of society.

The problem of housing shortage is brought out in the report of the Technical Group on Urban Housing Shortage (TG-12)[3], in which ways to fill the gap between the stock of affordable houses and the number of prospective beneficiaries, as well as provide more new affordable houses (Government of India, 2012) are suggested. The TG-12 report estimated the housing shortage in urban India to be about 187.8 lakh in 2012. In order to address this issue, the Government of India has launched the Pradhan Mantri Awas Yojana — Urban (PMAY- U)) scheme in June 2015. The scheme aims to construct approximately one crore affordable houses under the flagship programme 'Housing for All (HFA) by 2022' with all basic amenities.

The extent of investment in the housing sector has both direct and indirect effects on other sectors of the economy. Due to the strong interlinkage between various sectors of economy, any investment made in one sector has multiplied effects on other sectors, inducing economy-wide growth and employment opportunities. This is more so in the construction sector, which has strong backward and forward linkages with other sectors of the economy. The housing sector appears as one of the major employment generating sectors. In this context, investments made towards addressing the housing shortage offers an opportunity to stimulate growth in the economy as the sector is recognised for its potential for generating employment. Thus, there is a possibility for employment generation through the housing initiative, which is expected to meet the twin objectives of shelter and work provision.

With this background, this paper attempts to analyse the extent of employment generated, both through direct and indirect channels, resulting from the of increased construction of PMAY(U) houses. It provides a general picture of the employment effects of the PMAY(U) construction activities. The first section briefly introduces the emergence of PMAY(U). The second section describes the existing literature, In the third section, a brief about the PMAY(U) scheme and issues that this study has attempted to address is provided. The analytical framework employed for the estimation of employment impact due to urban housing is covered in section four. The fifth section discusses the results and findings, while the last section concludes the study with a summary.

2. Review of Literature

The construction sector appears to have a higher level of linkages both forward and backward in terms of employment generation. Investment in the housing sector thus has potential for creating huge employment opportunities, both skilled and unskilled. The links between employment generation and investment in housing are evident from the pioneering works of Ball (1965), Strassmann (1976),

[2] *See: https://www.ideasforindia.in/topics/macroeconomics/the-challenge-of-job-creation.html*

[3] *The committee was constituted under the chairmanship of Prof Amitabh Kundu.*

and McCallum and Benjamin (1985). Ball (1965) considers that the construction of buildings and highways is one way of counteracting cyclical unemployment. Analysing architectural designs of selected construction projects, Ball (1965) found that the greater the amount of fabricated materials required/used, the more the person-days requirement will be. However, the effect on employment tends to vary across the types of construction processes due to differences between them. Likewise, McCallum and Benjamin (1985) interpret 'housing' as land, shelter, and services, which are key factors for Third World cities to sustain themselves through the rapidly changing urbanisation which will take place in the years to come[4]. Apart from providing shelter, the housing programmes bear other significant positive externalities in terms of employment, health, education, and overall living standard (Strassmann, 1976). According to Strassmann, the rising priority concerning housing in development policies, especially in the emerging economies, is to address issues such as migration and urban unemployment.

The government's policies on publicly funded housing in the initial period focused on providing shelter from the perspective of social welfare. Later on, the justification for housing provision shifted from 'social grounds' to the 'potential to provide employment for large numbers of people both directly and indirectly' (Tipple, 1994). Reviewing the links between employment and housing development, Tipple found that investment in housing is very effective in employment generation, especially among lower-income groups. There has been empirical evidence from several countries like Mexico, Kenya, and Ghana on employment potential through housing provision Germidis (1974), Ziss and Schiller (1982), and Syagga (1989). The construction cost attributed to labour utilised directly and indirectly in the production and distribution materials was estimated to be 41 per cent in housing construction activities in Ghana by Ziss and Schiller. The same was estimated by Syagga to 45 per cent in affordable housing constriction in Kenya.

A few studies have been done that focus on urban housing in the Indian context (D'Souza, 2019; Williams et al., 2018; Bhan, 2017; Kundu, 2014; Sangma, 2006). Most of these emphasise the links between urban housing provision and parameters like slum re-development and regional differences, policy issues, and sustainability of urban shelter settlements. Analysing the housing provisions for urban slums, D'Souza found that there is a potential for addressing urban poverty through the creation of employment for the slum population. Within the broader context of urbanisation, the housing strategy could be used as a policy strategy to tackle poverty among the slum population. Sangma found that urban housing policies have not only met the basic need of shelter, but also create employment on a massive decentralised scale and increase much-needed purchasing power in the hands of lower-income groups. However, no estimates of employment generation due to the government policy were provided by the author.

Similarly, Bhan analysed the PMAY(U) from a spatial perspective to assess to what extent the programme has been able to address the issues of transversality, transparency, and opacity. However, this study lacks the lens to address the employment effect of the PMAY(U) investment. Munjal et al. (2014) estimated the employment multipliers (both Type I and Type II) for the investment made in

[4] *As problems are more critical for the poor in Third World cities, where less resources available to manage and expand economic sectors enough to accommodate new labour market entrants (McCallum & Benjamin, 1985).*

the urban housing programme. They estimated type I and II employment multipliers for housing construction to be 2.69 and 4.06, respectively. However, their study did not provide an aggregate estimate of employment creation due to the investment made in this sector.

The present paper takes a holistic approach to bridging this gap by providing an aggregate estimate of the employment generated because of government spending in the urban housing programme PMAY(U). There are a number of inter-sector transactions that occurred due to the PMAY(U) investment because of the increased demand for construction-related materials. As a consequence, there has been employment generation through both direct and indirect channels. The research questions in this discourse empirically addressed are as follows: How many person-days of work have been generated due to accelerated activities under PMAY(U) with respect to completed and under construction houses? What is the employment potential of a house of approximately 30 sq m under the different verticals? What is the number of employment created in ancillary and allied sectors?

3. A Brief of the PMAY(U)

The government of India have adopted several reforms in their urban housing programmes including the enhancement of assistance and use of information technology, alongside operational changes, which led to the broadening of the urban housing progamme as PMAY(U) in June 2015. Under this programme, central assistance is provided to Urban Local Bodies (ULBs) and other implementing agencies through states/UTs for construction of affordable houses for the urban poor.

The guidelines of PMAY(U) explain the operational features of the programme in detail (MoHUA, 2017). The scheme provides central assistance to the implementing agencies through states/UTs for housing construction for eligible urban families/beneficiaries in four verticals: (a) Beneficiary-led Construction (BLC)/Enhancement (BLE); (b) Affordable Housing in Partnership (AHP); (c) In Situ Slum Redevelopment (ISSR); (d) Credit Linked Subsidy Scheme (CLSS). PMAY(U) is primarily a demand-driven scheme unlike the rural housing scheme, which is a supply-driven scheme. A beneficiary of the scheme is eligible to take benefit under only one vertical based on the household income level and other eligibility criteria. States/UTs are responsible for deciding at their discretion a cut-off date (preferably through legislation) for urban dwellers to be eligible under the scheme.

A beneficiary family comprises a husband, wife and unmarried children. The beneficiary family should not own a pucca house (an all-weather dwelling unit) either in his/her name or in the name of any member of his/her family in any part of India (MoHUA, 2017). Furthermore, beneficiaries are categorised based on their vulnerability status and different income segments such as Economically Weaker Section (EWS), Lower Income Group (LIG), Middle Income Group – I or II (MIG-I, MIG-II). Some of the scheme's salient features are presented in the National Institute of Public Finance and Policy (NIPFP) study (2019).

4. Analytical Framework

The extent of employment both direct and indirect is conceptualised as the number of person-days generated due to the PMAY(U) activities. Direct employment is defined as the number of person-days generated directly for construction activities of PMAY(U) houses. Direct employment is estimated for both the completed houses as well as the under-construction houses, i.e. for those houses which are

at different points of the construction process (foundation and plinth, lintel, and roof cast). Indirect employment is defined as the person-days generated in allied and other sectors of the economy as a result of the increased investment made in the PMAY(U) housing through its forward and backward linkages.

Estimation of Direct Employment

The direct employment generated due to the PMAY(U) scheme is estimated using housing design details (Ball, 1965). As the housing designs and costs involved in houses tend to differ across locations, all Indian states are divided into two regions: the plains and the hills. Housing designs are available for each state and construction activities with details of the labour and material requirements given in the Detailed Project Report (DPRs)[5]. The DPRs contains the house/building designs with detailed estimations of labour and material requirements. The ULBs prepare the DPRs for the Beneficiary Led Construction (BLC) projects and developers (public/private) prepare DPRs for 'In Situ Slum Redevelopment/ Affordable Housing in Partnership (ISSR/AHP)' projects. These are finally submitted first, to the states and then, from the states to the centre for approval and sanctions.

For operational purposes, the BLC DPRs from Uttarakhand (Chinyalisaur, Uttarkashi District) and Tamil Nadu (Kattumannarkoil, Cuddalore District) are considered a representation of the plains and hill areas, respectively. Similarly, the AHP DPR from Andhra Pradesh is considered for estimating the labour requirement (directly) in the AHP/ISSR projects. As AHP/ISSR projects are developed in the plains areas of hilly states, we do not have a distinction between hills and plains in case of AHP/ ISSR projects. Moreover, AHP and ISSR projects are similar except for the locations and category of beneficiaries. Therefore, for estimating direct employment generation, the AHP DPR is also taken as a proxy for ISSR projects (NIPFP, 2019).

Direct Employment Generation per BLC Dwelling Unit

In order to estimate the direct employment (person-days) generation per BLC dwelling unit in a robust manner, a few assumptions are made as given below:

a. The carpet area per unit of BLC house is assumed to be 25.33 sq m. (Average carpet area of construction as given in DPRs of states).
b. For BLE component, the carpet area is assumed to be 15 sq m.
c. There are four stages of construction activities: Foundation and Plinth, Lintel, Roof-cast, and Finishing.
d. There are two sets of labourers: skilled and unskilled involved in each stage of construction.
e. The wage rates for labour (both skilled and unskilled) as provided by the state officials of Tamil Nadu and Uttarakhand for plains and hills, respectively, are assumed to be the same across states.
f. The activities in the DPRs are matched with the CPWD Analysis of Rates 2016[6] to estimate the labour input (person-days) in the respective activity.
g. The estimated numbers are further verified with the respective stakeholders of ULBs and the respective state.

[5] *The DPRs of BLC projects is prepared by the ULBs and DPRs of AHP and ISSR by the respective developers*

[6] *https://cpwd.gov.in/Publication/DAR(Civil)I.pdf*

Based on the assumptions above, the estimated direct person-days generated per unit BLC dwelling unit are given in Table 1. The person-days generated per BLC dwelling units estimated from DPRs are cross-verified with the primary data by conducting telephonic interviews with the BLC beneficiaries. Telephone interviews were conducted for 70 beneficiaries across seven states covering aspects such as the carpet area of PMAY(U) houses, the number of person-days employed for the construction and total cost of the dwelling unit. The person-days required per square metre of housing construction is derived and compared with the estimated DPR numbers. For one square metre the number of labour required is 11 person-days which is inclusive of 3.81 skilled person-days and 7.19 unskilled person-days. It may be noted that in both the states (Tamil Nadu and Uttarakhand), the estimations based on DPRs and via telephone interviews are found to be almost similar. Hence, the estimates from the DPRs are robust.

Table 1: Employment (Person-days) Generated per BLC Dwelling Unit

Construction activities	Hilly Areas			Plains Areas		
	Skilled	Unskilled	Total	Skilled	Unskilled	Total
Foundation & Plinth	**21.70**	**63.23**	**84.93**	**14.33**	**41.08**	**55.41**
Earth work in excavation	0.00	5.52	5.52	0.00	2.04	2.04
Filling excavated land/gravel/sand	0.00	1.90	1.90	0.00	3.23	3.23
Providing and laying cement concrete	0.25	5.81	6.06	0.55	12.80	13.35
Providing and laying RCC	1.21	20.53	21.73	–	–	–
Columns, Pillars, Piers, Abutments, Posts and Struts	6.91	13.82	20.73	–	–	–
Steel reinforcement in RCC	10.25	10.25	20.49	–	–	–
Random rubble masonry	3.09	5.40	8.49	–	–	–
Brick work				13.78	23.01	36.79
Lintel (RCC and Brick Work)	**13.82**	**52.17**	**65.99**	**13.96**	**46.47**	**60.43**
RCC in walls	1.64	22.43	24.06	–	–	–
Putting beams, girders, bressummers and cantilevers	3.39	6.79	10.18	–	–	–
Brick work	8.79	22.96	31.74	13.96	46.47	60.43
Roof	**12.99**	**34.80**	**47.79**	**9.51**	**26.46**	**35.97**
Centering and shuttering	8.67	17.35	26.02	4.97	9.93	14.90
RCC	4.31	17.46	21.77	0.87	12.01	12.88
Weathering course	–	–	–	0.30	1.14	1.44
Supplying, fabricating and placing mild steel	–	–	–	3.38	3.38	6.75
Finishing	**41.20**	**75.78**	**116.98**	**34.78**	**58.08**	**92.86**
Structural steel work	1.69	1.35	3.03	2.67	2.11	4.77
Cement plaster	13.90	34.65	48.55	13.63	33.98	47.62

Construction activities	Hilly Areas			Plains Areas		
	Skilled	Unskilled	Total	Skilled	Unskilled	Total
Cement concrete flooring	3.03	9.24	12.27	7.56	8.21	15.76
Providing and fixing doors, windows and clerestory windows	4.69	3.10	7.78	0.17	0.17	0.34
Whitewashing with lime	0.00	3.74	3.74	–	–	–
Waterproofing walls	3.82	2.74	6.55	–	–	–
Painting walls	1.33	0.78	2.11	4.81	8.36	13.17
Construction septic tank and soak pit	3.50	12.96	16.46			
Providing and fixing water supply pipes and sanitary wares	3.94	1.93	5.87	1.97	1.18	3.15
Internal electrification	5.29	5.29	10.60	3.87	3.87	7.75
Contingencies				0.10	0.20	0.30
Total	89.71	225.99	315.70	72.57	172.09	244.66

Note: Labour inputs are estimated from Analysis of Rates (AOR) based on Central Public Works Department (CPWD), Government of India, 2018; Carpet area of 25.33 sq m. The existence of missing cells is because of difference in DPRs and the terminology used in the selected DPRs.

Table 1 shows the total and stage-wise number of person days required in both the plains and hilly regions for the construction of one BLC dwelling unit of size 25.33 sq m. A total of 244.46 person-days is required in the plains, of which the skilled labour required is 72.57 person-days. In hilly regions, 315.70 person-days are required of which 89.71 person-days of skilled labour and 225.99 person-days of unskilled labour are required during the construction of a dwelling unit of the specific carpet area size. The finishing stage requires the maximum number of person-days of both skilled and unskilled labour in both the plains and hilly areas.

There is a difference in the total unit cost given in the DPRs and the estimates assumed in this study. The differences are mainly due to a higher cost of material and labour wages compared to the DPRs, as per given market prices provided by the respective state governments. The cost composition of a PMAY(U) house reveals that construction materials being the major component in the overall expenditure constitute approximately 60-70 per cent of the total cost while labour cost is approximately 30-40 per cent. Within the total labour cost, skilled labour costs are around 35-40 per cent while unskilled is around 60-65 per cent .

Direct Employment Generation per Dwelling Unit in an AHP/ISSR Project

In order to estimate the direct employment generated per dwelling unit in an AHP/ISSR project in a robust manner, the following assumptions were made:

a. The size of an AHP/ISSR dwelling unit is assumed to be 30 sq m (average of the state).
b. Due to a lack of information with regard to the different stages of construction, it is assumed that the houses under construction would have completed by 80 per cent, 60 per cent, 40 per cent and 20 per cent for the houses sanctioned in 2015-16, 2016-17, 2017-18, and 2018-19, respectively.

The estimated number of person-days at each level will be derived from the total number of person-days required to complete an AHP/ISSR dwelling units proportionately.

c. There are two sets of labourers: skilled and unskilled involved in each stage of construction.
d. The detailed labour requirement is taken from the DPR of Andhra Pradesh.

Based on these assumptions, the direct employment generated from construction per dwelling unit of AHP/ISSR project is given in Table 2. The table reveals that to complete the construction of a dwelling unit under AHP/ISSR verticals of PMAY(U), a total of 219 person-days are required of which 137 person-days are skilled and 82 person-days are unskilled. Most employment (person-days) is generated in the finishing activities (102 person-days) followed by the lintel level (56 person-days).

Table 2: Employment (Person-days) Generated per AHP/ISSR Dwelling Unit

Stages of construction work	Skilled	Unskilled	Total
Foundation & Plinth	5	18	23
Lintel	15	41	56
Roof	15	23	39
Finishing	47	55	102
Total	82	137	219

Source: Estimated from the information collected in field visit of Andhra Pradesh

The average cost per square metre is estimated to be Rs 13,637 and Rs 15,784 for the plains and hills, respectively[7]. The differences in the cost between the plains and hills are due to the fact that the transportation cost is higher in the hills owing to the difficult terrain.

Estimation of Indirect Employment

Due to the PMAY(U) programme, housing construction activities create a demand for construction materials, auxiliary services such as cement, steel, bricks (clay products), as well as other sectors through their forward and backward linkages. The increased demand thus creates employment opportunities in these segments which are termed as indirect employment due to the PMAY(U) construction activities[8]. In estimating the employment generated in the overall economy due to increased demand (investment) in a particular sector, the Input-Output (I-O) analysis is used most frequently in the literature (Leontief, 1936; Munjal et al., 2014; NIPFP, 2018).

The IO analysis is widely used as an analytical tool to analyse the inter-linkages between the sectors of an economy using the Leontief Inverse Matrix, also known as the 'multiplier matrix' (Leontief, 1936). This method allows the estimation of both direct and indirect impacts of a particular sector on different parameters of economic performance. The structure of the IO analysis consists of the inter-sector flows of products from sector *'i'* to sector *'j'* as an intermediate/primary input in order to produce one unit of output of sector *'j'.* The IO table essentially populates the numerous transaction

[7] *Per sq m cost is estimated from DPRs with a carpet area of 30 sq m.*

[8] *While estimating for economy wide employment, indirect employment may not be counted, as indirect employment in the housing sector could be direct employment in other sectors.*

in monetary terms amongst the sectors i.e., from sector *'i'* to sector *'j'*. The inter-sectoral transactions give a set of linear relationships that describe the input requirements and output distribution of each sector of the economy.

The IO method is thus based on the core concept of technical coefficient (a_{ij}) that refers to the amount of input from sector *'i'* required to produce one unit of output of the sector *'j'* and is expressed given as below:

$$a_{ij} = \frac{X_{ij}}{X_j} \; ; i, j = 1, 2, 3, \cdots, n$$

Given that the IO table is presented in monetary terms, a_{ij} gives the proportional value of the input purchased from all sectors per monetary unit of output. The basic final demand equation in the Input-Output table is given below:

$$X_j = \sum_{j=1}^{n} a_{ij} X_j + F_j$$

In matrix notation:

$$(I - A)X = F$$

$$X = (I - A)^{-1} F$$

Here A ($n \times n$) is the technical coefficient matrix, X ($n \times 1$) is the vector of outputs and F ($nx1$) is the vector of final demand. The column sum of the technical coefficient matrix reflects the input structure of the respective sector. The matrix is $(I - A)^{-1}$ known as the Leontief Inverse matrix or the multiplier matrix which is the key component for deriving the specific multiplier.

The employment multiplier of j^{th} sector gives the creation of additional employment in the economy due to an increase in its final demand by one unit. It is derived as, $\sum_{i=1}^{n} l_i r_{ij}$, where l^i is the row vector of employment coefficients for different sectors and is the Leontief Inverse matrix. It measures the direct and indirect employment created in the economy when the final demand for j^{th} sector increases by one unit. It should also be noted that additional job creation in the economy can be interpreted in relation to direct employment in a particular sector. This can be expressed as the ratio of total additional employment in the economy to the employment generated in a sector.

For analytical purposes, the present study will use the benchmark estimates from the 130 sectors (commodity × commodity) IO Table 2013-14 of India given by Singh & Saluja (2018) based on the CSO Supply and Use Table 2012-13. The employment multiplier is used to derive the number of jobs

generated in different sectors as a result of the investments made for the construction of affordable houses under PMAY(U). The construction of housing is a sub-component of the construction sector as a whole. As the IO 2013-14 does not give a separate multiplier for the housing sector alone, the construction sector multiplier is used as a proxy for the urban housing sector.

The investments made (total expenditure) in the urban housing programme (including beneficiary contribution as estimated by the MoHUA) is an increased demand for the sector in specific and the construction sector as a whole. This will lead to the creation of direct employment in construction activities, and due to the interlinkages across the different sectors, there will be indirect employment as well. As the IO Table is based on a new series data with 2011-12 as the base year, expenditure figures on the PMAY(U) are deflated using construction sector deflators to make them comparable/ consistent with the IO Table 2013-14 estimates. However, the limitation of the IO Table lies in the assumption of constant input coefficient under the projected conditions implying its suitability in short run projections. In the long run, the input coefficients might change, and thus the reliability on the fixed input coefficient weakens.

However, the Input-Output analysis generates only the number of jobs per unit of investment, which needs to be converted into person-days. To convert the employment figures from number of jobs into person-days and vice versa, this study has analysed unit-level data from the NSSO 68th Round Employment and Unemployment Survey (2011-12). This study estimated the average number of work-days in the last seven days preceding the date of the survey according to Current Daily Status (CDS) activity of a casual labourer in public infrastructure construction. The estimated average number of work days per week is found to be 5368 days considering for usual status (principal and subsidiary) activity for age category of 15 years and above, which is equivalent to 280 days in a year. In other words, it can be interpreted as 280 person-days of work employment being equal to one gainful job generated in the construction sector. Put in another way, it explains that one employed person works for an average of 280 days in a year under both principal and subsidiary status.

5. Results and Discussions

Physical Progress and Related Concerns

Table 3 presents the physical progress of the PMAY(U) scheme. As on March 31, 2019, about 80.65 lakh houses were sanctioned, of which 51.32 per cent are grounded. Out of the total houses grounded, the total houses completed and under construction are 20.79 lakh and 20.61 lakh, respectively. The number of self-constructed or individual type houses (BLC and individual CLSS) completed and under construction houses together are 13.69 lakh (54.11 per cent of grounded houses) and 11.62 lakh (45.88 per cent of grounded houses) respectively. Under the apartment type houses (AHP, ISSR, and apartment CLSS) together, the total number of houses completed and under construction are 7.10 lakh (44.13 per cent) and 8.99 lakh (55.87 per cent) respectively.

Table 3: Physical Progress under PMAY(U) *(in lakhs)*

Scheme	Year	Sanctioned	Grounded	Completed	Under Construction
BLC, and CLSS (Individual)	2015-16	2.26	1.69	1.38	0.31
	2016-17	6.76	5.57	3.34	2.23
	2017-18	14.64	10.19	6.07	4.12
	2018-19	22.33	7.85	2.90	4.95
	Total	**45.99**	**25.30**	**13.69**	**11.62**
AHP, ISSR, and CLSS (Apartment)	2015-16	3.55	2.91	1.68	1.22
	2016-17	2.77	1.63	0.34	1.29
	2017-18	12.05	7.14	1.90	5.24
	2018-19	16.29	4.41	3.17	1.24
	Total	**34.65**	**16.09**	**7.10**	**8.99**
PMAY (U)	2015-16	5.82	4.60	3.06	1.54
	2016-17	9.53	7.20	3.68	3.53
	2017-18	26.69	17.33	7.97	9.36
	2018-19	38.61	12.27	6.08	6.19
	Total	**80.65**	**41.39**	**20.79**	**20.61**

Source: Compiled from data provided by MoHUA, 2019 up to 31 March.

Since the inception of the scheme, the sanctioning of houses has picked up in the last two years with a corresponding increase in the grounding, except in 2017-18 in which, as the data suggest, this was not witnessed. In terms of completion, there exists a large gap as it is evident that only 50 per cent have been completed.

Most of the houses are sanctioned under the BLC verticals (including the individual type CLSS) but the completion rate is low over the years. However, there has been an improvement particularly in the apartment-type dwelling units in 2018-19 with around 72 per cent of grounded houses being completed.

The gap in completed-grounded houses may be explained by the issues in fund flow including the delayed release of instalments from the government (both centre and state share) to the ULBs and subsequently to the beneficiaries (in case of BLC) and the developers (in case of AHP/ISSR projects). On the part of the ULBs, there are also issues affecting the speed of implementation of the scheme. Many ULBs are unable to submit the utilisation certificates on time affecting the overall flow of funds. At the ground level, there are issues like demand-supply gap of raw materials and construction workers, infrastructural gap, credit unavailability, diversion of money to other activities, etc., which are causing a delay in construction activities. On account of using Information and Technology (IT) tools such as geo-tagging and DBT (in case of BLC verticals), there has been some improvement in the overall implementation of the scheme. The Ministry of Housing and Urban Affairs (MoHUA) has also been working to introduce the geo-tagging and GIS techniques in the case of AHP/ISSR verticals to speed up the implementation of the scheme.

Total Expenditure on the Programme

Since its implementation, the total money spent across the four verticals is estimated to be Rs 188,723.71 crore as on 31 March, 2019 in current prices. Most of this money has been spent on the flat-type dwelling units (AHP/ISSR/CLSS), accounting for 59.83 per cent of the total expenditure. Clearly, it can be seen that an effort is made to achieve the target of 'Housing for All by 2022' as indicated by the large sum of money pumped into the urban housing programme in the last two years. The total estimated expenditure in 2018-19 is more than thrice that of 2016-17 although it is slightly lower than 2017-18.

As the 2013-14 IO table is based on 2011-12 constant prices, in order to get a nuanced estimate of the employment numbers, the expenditure figures need to be used at constant prices. The construction sector deflator is used to make it more robust. Accordingly, the total expenditure at constant prices (2011-12 series) stands out to be 154,720.32 crore across all verticals of PMAY(U) (Table 4).

Table 4: Total Expenditure (Rs. crore) under the Different Verticals of the PMAY(U)

Scheme	Year	At Current Prices (2011-12)			At Constant Prices (2011-12)		
		Completed	Under Construction	Total	Completed	Under Construction	Total
BLC, and CLSS (Individual)	2015-16	5,193.60	301.70	5,495.30	4,540.17	263.74	4,803.91
	2016-17	11,764.88	1,861.99	13,626.87	10,044.95	1,589.78	11,634.73
	2017-18	24,834.79	3,701.13	28,535.92	20,607.52	3,071.14	23,678.66
	2018-19	23,397.22	4,452.62	27,849.84	18,506.03	3,521.80	22,027.83
Sub Total		*65,190.49*	*10,317.44*	*75,507.93*	*53,698.67*	*8,446.46*	*62,145.13*
AHP, ISSR, and CLSS (Apartment)	2015-16	9,863.31	5,749.19	15,612.50	8,622.35	5,025.86	13,648.21
	2016-17	2,785.83	4,521.48	7,307.32	2,378.57	3,860.48	6,239.04
	2017-18	20,482.94	12,177.40	32,660.33	16,996.42	10,104.61	27,101.04
	2018-19	56,140.89	1,494.74	57,635.63	44,404.63	1,182.27	45,586.90
Sub Total		*89,272.97*	*23,942.82*	*1,13,215.78*	*72,401.97*	*20,173.22*	*92,575.19*
PMAY (U)	2015-16	15,056.91	6,050.89	21,107.80	13,162.52	5,289.59	18,452.11
	2016-17	14,550.71	6,383.47	20,934.18	12,423.52	5,450.26	17,873.77
	2017-18	45,317.72	15,878.53	61,196.25	37,603.94	13,175.76	50,779.70
	2018-19	79,538.11	5,947.37	85,485.48	62,910.66	4,704.07	67,614.73
Grand Total		1,54,463.46	34,260.25	1,88,723.71	1,26,100.64	28,619.68	1,54,720.32

Notes: 1. Current price includes actual expenditure for BLC, AHP, ISSR, and CLSS verticals.
2. Expenditure of CLSS vertical is based only on the loan amount.
3. Construction sector deflators are used to estimate the constant prices.

Source: Estimated from the Physical Progress Report as on 31 March, 2019, MoHUA, Govt. of India

Table 5: Year-wise Total Employment (Direct + Indirect) Generated in the Economy due to Expenditure Under PMAY(U) in Crore Person-days

Scheme	Year	Direct			Indirect			All		
		Completed	Under Construction	Total	Completed	Under Construction	Total	Completed	Under Construction	Total
BLC, and CLSS (Individual)	2015-16	3.40	0.16	3.56	1.28	0.11	1.38	4.67	0.27	4.94
	2016-17	8.59	1.11	9.69	1.75	0.53	2.28	10.34	1.64	11.97
	2017-18	16.05	2.15	18.20	5.16	1.01	6.17	21.21	3.16	24.37
	2018-19	14.06	2.78	16.84	4.98	0.84	5.83	19.05	3.62	22.67
Sub Total		*42.10*	*6.20*	*48.30*	*13.17*	*2.49*	*15.66*	*55.26*	*8.69*	*63.96*
AHP, ISSR, and CLSS (Apartment)	2015-16	3.71	2.14	5.85	5.16	3.03	8.20	8.87	5.17	14.05
	2016-17	0.95	1.70	2.65	1.50	2.28	3.77	2.45	3.97	6.42
	2017-18	7.27	4.58	11.85	10.22	5.82	16.04	17.49	10.40	27.89
	2018-19	19.81	0.54	20.35	25.89	0.68	26.57	45.70	1.22	46.92
Sub Total		*31.74*	*8.96*	*40.70*	*42.78*	*11.80*	*54.58*	*74.51*	*20.76*	*95.27*
PMAY (U)	2015-16	7.11	2.30	9.41	6.44	3.14	9.58	13.55	5.44	18.99
	2016-17	9.54	2.80	12.34	3.25	2.81	6.06	12.79	5.61	18.39
	2017-18	23.32	6.73	30.05	15.38	6.83	22.21	38.70	13.56	52.26
	2018-19	33.87	3.32	37.19	30.87	1.52	32.39	64.74	4.84	69.59
Grand Total		73.83	15.16	89.00	55.94	14.29	70.23	129.78	29.45	159.23

Source: Authors' calculation using physical progress data and DPR details

Table 6: Year-wise Total Employment (Direct + Indirect) Generated in the Economy due to Expenditure Under PMAY(U) in Lakh Jobs

Scheme	Year	Direct			Indirect			All		
		Completed	Under Construction	Total	Completed	Under Construction	Total	Completed	Under Construction	Total
BLC, and CLSS (Individual)	2015-16	1.21	0.06	1.27	0.46	0.04	0.49	1.67	0.10	1.77
	2016-17	3.07	0.39	3.46	0.62	0.19	0.81	3.69	0.58	4.28
	2017-18	5.73	0.77	6.50	1.84	0.36	2.20	7.57	1.13	8.70
	2018-19	5.02	0.99	6.02	1.78	0.30	2.08	6.80	1.29	8.10
Sub Total		*15.03*	*2.22*	*17.25*	*4.70*	*0.89*	*5.59*	*19.74*	*3.10*	*22.84*
AHP, ISSR, and CLSS (Apartment)	2015-16	1.33	0.76	2.09	1.84	1.08	2.93	3.17	1.85	5.02
	2016-17	0.34	0.61	0.95	0.54	0.81	1.35	0.87	1.42	2.29
	2017-18	2.60	1.64	4.23	3.65	2.08	5.73	6.25	3.71	9.96
	2018-19	7.07	0.19	7.27	9.25	0.24	9.49	16.32	0.43	16.76
Sub Total		*11.33*	*3.20*	*14.54*	*15.28*	*4.21*	*19.49*	*26.61*	*7.41*	*34.03*
PMAY (U)	2015-16	2.54	0.82	3.36	2.30	1.12	3.42	4.84	1.94	6.78
	2016-17	3.41	1.00	4.41	1.16	1.00	2.16	4.57	2.00	6.57
	2017-18	8.33	2.40	10.73	5.49	2.44	7.93	13.82	4.84	18.66
	2018-19	12.10	1.19	13.28	11.03	0.54	11.57	23.12	1.73	24.85
Grand Total		26.37	5.42	31.78	19.98	5.10	25.08	46.35	10.52	56.87

Notes: 1. One job effectively represents 280 of working days (person-days).
2. The conversion formula is estimated based on the NSSO Employment Unemployment Survey 2011-12.

Source: Authors' calculation using physical progress data and DPR details

Impact on Employment Generation

Direct Employment

As mentioned in the Methodology section, employment figures are presented in two ways: person-days and number of jobs (Table 5 and 6). The total direct employment generated under the PMAY(U) programme cumulative for the period from June 2015 up to March 2019 using the DPR details is Rs 89.00 crore person-days (31.78 lakh jobs). Out of the total direct employment generated, the construction of individual type houses (BLC and individual CLSS) alone generated 48.30 crore person-days (17.25 lakh jobs), and construction of apartment type houses (AHP, ISSR, and apartment CLSS) generated 40.70 crore person-days (14.54 lakh jobs). A year-wise analysis reveals that most of the direct employment was generated in 2018-19 (41.79 per cent) followed in 2017-18 (33.76 per cent) on account of grounding the maximum number of houses.

The DPR details allow categorisation of direct employment into skilled and unskilled employment generated under the PMAY(U) programme. The relatively large employment-generating impact of the urban housing programme can be attributed to the housing designs. Often these designs do not incorporate the installation of luxury items and correspondingly, the share of unskilled labour is relatively higher as compared to high- end construction activities. The fact that most houses of this kind are low cost and targeted for the people in the lower end of income distribution, they have potential for employment creation, especially for unskilled individuals in the low income category.

Table 7 presents a break-up of the cost of a dwelling unit into different components. It can be seen that the share of labour in the total cost ranges from 30-40 per cent of a BLC dwelling unit and 20 per cent in a AHP/ISSR dwelling unit. The share of unskilled labour as part of total labour costs ranges from 55-65 per cent and it is much higher in the hilly regions (BLC vertical) as compared to BLC (plains) and AHP/ISSR dwelling units.

Table 7: Cost Break-up of Dwelling Unit

Vertical	Size	Total Estimated Cost	Material share	Labour Share	Share of Skilled labour cost in Total labour cost	Share of Unskilled labour cost in Total labour cost
BLC (Hills)	25.33	405283	60.69	39.31	34.46	65.54
BLC (Plains)	25.33	352664	71.01	28.99	40.25	59.75
AHP/ISSR	30.00	581000	63.98	19.15	44.31	55.69

Source: Authors' calculations from DPRs

Table 8 reveals that the amount of unskilled labour required is almost more than double to that of skilled labour. In regards to total direct employment, about 67.16 per cent is unskilled and 32.84 per cent skilled labour. The roles of mason, fitter, blacksmith, painter, and carpenter are categorised as skilled labour whilst helpers, construction workers and other people are considered unskilled labour. In terms of person-days generated directly due to the urban housing programme, the total skilled employment generated is estimated to be Rs -29.23 crore (10.44 lakh jobs) of which 15.22 crore person

days (5.44 lakh jobs) are generated in the apartment types construction activities and the remaining 14.01 crore person-days (5.00 lakh jobs) are generated in individual type houses. Total masonry work is estimated to be 20.69 crore person-days (7.39 lakh jobs) and 8.54 crore person-days (3.05 lakh jobs) are generated in other skilled activities such as electrical and others. More than 65 per cent of employment generated directly in the PMAY(U) scheme is unskilled, which includes construction workers and helpers.

Table 8: Break-up of Direct Employment into Skilled and Unskilled Labour

Employment Category	Crore Person Days			Lakh Jobs		
	Individuals	Apartments	Total	Individuals	Apartments	Total
Skilled	14.01	15.22	29.23	5.00	5.44	10.44
Mason (skilled)	10.43	10.26	20.69	3.73	3.66	7.39
fitter, blacksmith, painter, carpenter, etc. (other skilled)	3.58	4.96	8.54	1.28	1.77	3.05
Unskilled	34.29	25.48	59.77	12.25	9.10	21.35
Total Employment	48.30	40.70	89.00	17.25	14.54	31.78

Notes: Due to data limitation (Skilled and Unskilled employment number Singh & Saluja IO Table 2013-14, the similar break-up of employment is not estimated for indirect employment.

Source: Authors' calculation using Physical Progress Report and DPRs

Indirect Employment

Due to the investment of PMAY(U), the spill-over effects due to the inter-sector transactions generate indirect employment in sectors of the economy aside from the construction as well. The total indirect employment generated under the PMAY(U) programme cumulative for the period from June 2015 up to March 2019 is estimated to be 70.23 crore person-days (25.08 lakh jobs) (Table 6 and 7). Out of the total indirect employment generated, the investment in individual type house construction (BLC and individual CLSS) alone generated indirect employment of 15.66 crore person-days (5.59 lakh jobs). The investment in apartment type houses on the other hand (AHP, ISSR, and apartment CLSS), generated indirect employment of 54.58 crore person-days (19.49 lakh jobs).

A detailed break-up of indirect employment generated in selected immediate ancillary sectors and other sectors is presented in Table 9. Among the selected sectors, most of employment is generated indirectly in the Structural Clay Products (3.37 person- days) and Electronic Equipment (including TV) (3.37 person-days), followed by Furniture and Fixture-Wooden (2.42 crore person-days), Land transport including via pipeline (2.31 crore person-days), and Wood and Wood Products (0.93 crore person-days). About 0.78 crore person-days of employment are generated indirectly in the Iron sector and about 0.36 crore person days are generated in Cement sector.

Table 9: Generation of Indirect Employment in the Ancillary and Allied Sectors due to Expenditure Under the Different Verticals of PMAY(U)

Sector	Crore Person Days	Lakh Jobs
Structural clay products	3.37	1.20
Cement	0.36	0.13
Furniture and fixtures-wooden	2.42	0.86
Wood and wood products	0.93	0.33
Hand tools, hardware	0.57	0.20
Iron, steel and ferro alloys	0.32	0.11
Iron and steel casting & forging	0.46	0.17
Electronic equipment (including TV)	3.37	1.20
Paints, varnishes and lacquers	0.13	0.05
Electrical wires & cables	0.04	0.01
Land transport including via pipeline	2.31	0.82
Others	57.43	20.51
Total Indirect	71.70	25.61

Source: Authors' calculations

6. Conclusion

This paper has attempted to estimate the employment generated due to the urban housing scheme PMAY(U). Based on physical progress statistics, the total expenditure on the scheme is estimated to be Rs 188,723.71 crore since its inception, which should have a significant impact on employment generation, not only in the construction sector but also in the other sectors of the economy. The total employment generated under all four verticals of PMAY(U) is estimated to be Rs 159.23 crore person-days which is equivalent to 56.87 lakh jobs. Out of this, about 89.00 crore person-days (31.78 lakh jobs) are directly generated in construction activities, and 70.23 crore person-days (25.08 lakh jobs) are generated indirectly in the other sectors of the economy.

To sum up, the paper reveals that the urban housing scheme PMAY(U) programme has a significant impact on employment generation in the economy. Policy makers should recognise its employment potential and associated development outcomes, and accordingly, shift public provision for affordable housing up in the government agenda. The present paper also has its limitations. The cost and labour estimates are based on BLC DPRs which are only suggestive. Similarly, in the case of AHP and ISSR, the designs considered for analysis only use conventional methods for construction. Thus, any changes to those assumptions may alter the findings.

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