CARE WORK AND THE ECONOMY

Advancing policy solutions with
gender-aware macroeconomic models

A GENDERED SOCIAL ACCOUNTING MATRIX
FOR SOUTH KOREA

Hans Lofgren, Consultant
Kijong Kim, Levy Economics Institute
Marzia Fontana, Institute of Development Studies
Martín Cicowiez, Universidad Nacional de La Plata

*Corresponding author email: hanslofgren01@outlook.com

CWE-GAM WORKING PAPER

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THE CARE WORK AND THE ECONOMY (CWE-GAM) PROJECT

The Care Work and the Economy (CWE-GAM) Project strives to reduce gender gaps in economic outcomes and enhance gender equality by illuminating and properly valuing the broader economic and social contributions of caregivers and integrating care in macroeconomic policymaking toolkits. We work to provide policymakers, scholars, researchers and advocacy groups with gender-aware data, empirical evidence, and analytical tools needed to promote creative, gender-sensitive macroeconomic and social policy solutions. In this era of demographic shifts and economic change, innovative policy solutions to chronic public underinvestment in care provisioning and infrastructures and the constraints that care work places on women's life and employment choices are needed more than ever. Sustainable development requires gender-sensitive policy tools that integrate emerging understandings of care work and its connection with labor supply, and economic and welfare outcomes.

Find out more about the project at www.careworkeconomy.org.

THE AUTHOR TEAM

HANS LOFGREN

Hans Lofgren is an independent consultant and was formerly a Senior Economist at the World Bank where he developed MAMS (Maquette for Millennium Development Goal Simulations), a model for medium- to long-run country-level policy analysis that has been applied to some 50 countries with a focus on fiscal policy, human development, and the labor market. Before joining the World Bank in 2004 he was a Senior Research Fellow at the International Food Policy Research Institute (IFPRI). At IFPRI, he worked closely with Sherman Robinson to develop the IFPRI standard CGE model that may be world's most widely used single-country CGE model. He was a Research Fellow of the GTAP (Global Trade Analysis Project) for the period 2014-2017 in recognition of his contributions to single-country CGE modeling. Hans holds a Ph.D. in Economics from the University of Texas at Austin.

KIJONG KIM

Kijong Kim is a research associate in Gender Equality and the Economy program at Levy Economics Institute. His current research interests lie in distributional impact analyses of social and fiscal policies; social care investment; gender-oriented macro modeling; and econometric analysis of household and field surveys. The recent research includes a global projection of economic impact of care service expansion (ILO); distributional analysis of the early childhood care and education in Turkey (UNDP, UNW, ILO); and time and income poverty in Ghana and Tanzania; and analyses of household behaviors to the Great recession using time-use and consumption surveys. Kim has taught microeconomics, macroeconomics, and environmental economics at the International School of Economics at Tbilisi State University in Tbilisi, Georgia; and the Bard Center for Environmental Policy. He holds a B.S. in Economics from Korea University and a Ph.D. in Applied Economics from the University of Minnesota-Twin Cities.

MARZIA FONTANA

Marzia Fontana is a feminist economist with many years of research and teaching experience, with a special focus on unpaid work, labour markets, and international trade. She has contributed to the area of gender-aware economy-wide modelling and published a number of articles and book chapters on this topic.. Marzia is Research Associate at the Institute of Development Studies at Sussex and guest lecturer at the London School of Economics and Political Science, University of London. She is Gender Advisor for the Partnership for Economic Policy (PEP) Network (macroeconomic modelling component). Marzia has provided research and advisory support to a number of international organizations and NGOs including ILO, FAO, WFP, UNCTAD, UNIDO, UNDP, UNRISD, UN Women, the World Bank, the European Parliament, IFPRI, ActionAid, CAFOD, the Commonwealth Secretariat and One World Action. She has fieldwork experience mostly in Asia (India, Bangladesh, Laos PDR, Vietnam, Cambodia, and Fiji Islands).

MARTÍN CICOWIEZ

Martín Cicowiez is Professor at Universidad Nacional de La Plata in Argentina and Researcher at the University's Center for Distributional, Labor and Social Studies (CEDLAS). He holds a PhD in Economics from Universidad Nacional de La Plata. He specializes in the application of Computable General Equilibrium models and microsimulations to the assessment of policies and external shocks. He has published numerous articles in academic journals and edited volumes and coauthored five books. He has worked for international organizations such as the UN-DESA, UNDP, FAO, ILO, the World Bank, IDB, AfDB, UN-ECLAC, UN-ESCWA, ALADI, and PEP.

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Care Work and the Economy

1. INTRODUCTION

A Social Accounting Matrix (SAM) is a database that provides comprehensive but often very detailed perspective on flows of payments and linkages between the different parts of an economy: households of different types, producers of different outputs, the government, and the world outside the economy that is covered by the SAM. As a result, SAMs are valuable inputs into economic research, including as part of the databases of Computable General Equilibrium (CGE) models, which account for linkages throughout the economy.

SAMs can capture important aspects of care and gender, the focus of our ongoing analysis of South Korea. Care and gender decisions may have strong and manifold economywide linkages. To exemplify, if less time is spent on childcare in the home, more time may be allocated to income-generating market work. If women spend time on activities that serve their own households, the time of men in these activities is freed up for other activities. If the government raises subsidies to elderly care from the market, it may have to raise taxes while the households that benefit from this care get more resources at their disposal and may also decide to buy more care services. Together the different gender- and care-related actions by households and governments have effects throughout the economy in the form of changes in time allocation, production, consumption, trade, prices and wages, incomes, and wellbeing.

As an input to our analysis of care and gender, this paper documents a gendered Social SAM for South Korea for 2014: the steps followed in its construction, the data sources, and what the SAM says about the economic structure of this country (for brevity from now on referred to as Korea), including gender, time use, and the role of households in providing care and other services provided by households. While numerous SAMs have been developed for Korea (see for example Noh 2007 and Nam 2015), to the best of our knowledge, this is the first gendered SAM for this country and also the first Korea SAM that has an explicit treatment of care. The SAM that is presented will be applied to GEM Care, a CGE model developed for this analysis (Lofgren and Cicowiez 2020). This SAM is preliminary: it will be adjusted when the needs of the upcoming simulation analysis are defined in finer detail, including the treatment of government policy interventions related to child and elderly care.

In outline, this paper is organized as follows. Section 2 presents the basic features of SAMs and the structure of the SAM presented in this paper. Section 3 turns to the specifics of the Korea SAM of this paper, describing its disaggregation, data requirements, and the procedure followed when it was built. Finally, drawing on data in this SAM and complementary time use data, Section 4 describes the structure of care and household services in the context of Korea's broader economy. The electronic appendices include

the different versions of the Korea SAMs to which the text refers and the program that was used to build them drawing on data inputs from different sources.[1]

2. THE STRUCTURE OF A SAM FOR GEM CARE

A social accounting matrix (SAM) is an economywide consistent representation of the payments in an economy, linking production, primary factors, and institutions (the latter often split into households, government, and the rest of the world). In the words of Round (2003), "it is a comprehensive, flexible, and disaggregated framework which elaborates and articulates the generation of income by activities of production and the distribution and redistribution of income between social and institutional groups."[2] Most of the time, a SAM refers to the economy of a country during one year. It may be used to describe the structure of an economy and as a data input to economic models, most importantly CGE models. The fact that SAMs are consistent assures that they do not contain contradictory pieces of information, something that easily can happen to databases when consistency checks are not imposed on their different components. In order to meet the needs of gender analysis, the SAM defines the economy broadly to cover not only what is part of GDP but also household service production and leisure, to which values are imputed on the basis of replacement and opportunity costs.[3]

Table 2.1 shows the basic structure of the GEM Care SAM that is developed in this paper; its notation is found in Table 2.2. For an easy overview, it is highly aggregated compared to the empirical SAM that is presented in Section 3.3. It has only one household and production is split into four sectors (four production activities each of which produces one commodity): the two that are referred to as private and government are part of GDP while household services and leisure are outside the GDP sphere.[4] Instead of providing monetary values, this table describes the content of the cells that most likely would have values in an empirical gendered care SAM, like the one that is presented later in this paper.

Like any SAM, the one in Table 2.1 is a square matrix with identical accounts in rows and columns. The cells show payments from column accounts to row accounts. The sum of

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[1] The Korea SAMs presented in Section 3 are provided in the file Korea-SAMs-2020-dist.xlsx.

[2] For background on SAMs, see for example Round (2003) and Pyatt and Round, eds. (1985).

[3] Replacement costs here refer to the cost of replacing a service provided by the household by one purchased from the market. Opportunity costs are used to value leisure time on the basis of the wage income that is given up.

[4] In the Korea SAM with multiple households, household service commodities, household service activities, and labor factors are disaggregated by household. In terms of linkages for household services, each household only consumes services produced by its own activities using its own labor.

the entries in the column of an account represents its total expenditures while the sum of the entries in its row shows its total receipts. Because of consistency (a feature of the real world and, in the absence of errors in data or concepts, also of any SAM), the row and column totals of each account must be equal. This simply means that no account (or part of the economy) can spend more than it receives, and that any payment received must be used in some way that is captured in the SAM.

Table 2.1 Stylized for GEM Care ***

	act-prv	act-gov	act-hser	act-lei	com-prv	com-gov	com-hser	com-lei	f-lab	f-cap	hhd	gov	row	taxes	cap-hhd	cap-gov	cap-row	inv-prv	inv-gov	dstk	total
act-prv					output																
act-gov						output															
act-hser							output														
act-lei								output													
com-prv	interm	interm									cons	exp						inv	inv	dstk	
com-gov	interm	interm										cons									
com-hser											cons										
com-lei											cons										
f-lab	va	va	va	va								yrow									
f-cap	va											yrow									
hhd									va	va		trnfr	trnfr								
gov											trnfr		trnfr	taxes							
row					imp				yfac	yfac	trnfr	trnfr									
taxes	taxes				taxes						taxes										
cap-hhd											sav						nffng				
cap-gov												sav			ndfg		nffg				
cap-row													sav		drf						
inv-prv															inv		inv				
inv-gov																inv					
dstk															dstk						
total																					

Source: Authors' elaboration.

*For notation, see Table 2.2.

** Green cells show payments that are related to the non-GDP part of the economy. The yellow cell is the sum of GDP and non-GDP payments.

Table 2.2 Accounts and cell entries in stylized SAM for GEM care

Account	Explanation	Cell entry	Explanation
act-prv	activity - private (GDP) production	**dstk**	stock change
act-gov	activity - government production	**ndfg**	net domestic financing to government
act-hser	activity - household services	**nffg**	net foreign financing to government
act-lei	activity - leisure	**nffng**	net foreign financing to non-government
com-prv	commodity - private production	**cons**	consumption
com-gov	commodity - government production	**dstk**	stock change
com-hser	commodity - household services	**exp**	exports
com-lei	commodity - leisure	**imp**	imports
f-lab	factor - labor	**interm**	intermediate inputs
f-cap	factor - private capital	**inv**	investment (gross fixed capital formation)
hhd	household	**output**	production
gov	government	**sav**	savings
row	rest of world	**taxes**	taxes (direct and indirect)
taxes	taxes - domestic and trade	**trnsfr**	transfers
cap-hhd	capital account - household	**va**	value added
cap-gov	capital account - government	**yfac**	factor income to RoW
cap-row	capital account - rest of world	**yrow**	factor income from RoW
inv-prv	investment - private capital	**drf**	change in foreign reserves
inv-gov	investment - government capital		
dstk			

Source: Authors' elaboration.

The accounts of the SAM in Table 2.1 may be classified into activities, commodities, factors, institutions, and auxiliary accounts related to institutions, in this case, a set of tax and investment accounts. We will here take a tour of the SAM in Table 2.1, pointing out the roles of its different account types, including the location of the gender and care aspects that will become explicit in the disaggregated SAM that is presented later in this paper.

The activity accounts represent the entities that produce the outputs (goods or services), referred to as commodities. The SAM of Table 2.1 has four such accounts. In their rows, they receive sales receipts while their columns show their cost structures. For the different activities, the potential cost items are intermediate inputs, factors, and (net) producer taxes. In this stylized representation, the private activity has the most complete cost structure. The government activity makes no payment to the capital factor since, for the government, value-added is only attributed to labor. The household service account represents different types of care and other services that are produced by households for own consumption. Due to a lack of appropriately disaggregated data, the cells for

intermediate input and capital rent payments are zero for household services. In the SAM, such costs are part of other household consumption and investment (incl. housing). The labor inputs to household services and leisure are given values defined to be relevant to household decisions even though payments are not made in relation to household work or leisure.

The four commodity accounts represent the outputs of the production activities. The private output is also imported. The row entries of the commodity accounts show payments from commodity demanders (for the private commodity including exports to the rest of the world); the column entries show payments to the suppliers (domestic and foreign, i.e. imports) and for indirect commodity (or product) taxes.

The factor accounts are split into labor and private capital. Their row entries indicate that they earn value-added (including values attributed to household services and leisure) from domestic production activities and income from the rest of the world. In the columns of the factor accounts, value-added is distributed to the owners of the factors. Payments to and from the rest of the world tend to be more important for capital (received due to foreign investments) than for labor since for the latter it only refers to payments that are related to income earned by labor in a country in which it is not defined as resident.[5] The institutions in the SAM of Table 2.1 are split into a household (an aggregate non-government or "private" institution), government, and the rest of the world (RoW). Each institution has a current account and a capital account. In the rows of their current accounts, these institutions receive value-added, transfers from other institutions, taxes (only for the government), and payments for imports (only for the rest of the world). Along their current account columns, the institutions spend on commodity purchases (consumption for the household and the government, and exports for the rest of the world), direct taxes (for the household), transfers to other institutions, and savings. The household is the only demander of household services and leisure; this means that the circular flow of payments related to these items are internal to the household (the household consumption value equals the cost and income of labor). However, the leisure and household service decisions that underpin these payments are made jointly with household decisions related to the GDP sphere.

For each institutional capital account, the receipts are savings (from the current account of the same institution) and net financing from the capital accounts of other institutions (for the government, from the rest of the world and the household; for the household, from the rest of the world). If these payments are negative, then they flow in the opposite direction. In turn, the payment from the domestic non-government capital account to the foreign capital account records the change in foreign reserves.[6]

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[5] Payments in the cell sam('f-lab','row'), if any, apply to labor income remitted from abroad for workers that are defined as resident in Korea (the country of the SAM). Transfers from Korean workers that are considered resident abroad are part of the payment in the cell sam('hhd','row').

[6] Note that the financing of the foreign reserves change comes from the household capital account. This reflects the fact that, in the background, the financial sector, which finances the foreign reserve change, is

In addition to net financing of other institutions, the capital accounts spend on investment, which here refers to fixed capital formation and is split into private and government, and stock change. Foreign investment is represented by the payment to the private investment account from the capital account of the rest of the world. The inclusion of capital accounts and their payments – not featured in most SAMs – makes it possible to calculate changes in domestic and foreign debts and thus assess the sustainability of government and private finances. Finally, in their columns, the two investment accounts (private and government) pass on their financing to demands for commodities used to construct new capital stocks. For the account for stock (or inventory) change, financing received in its row (here from the household capital account) is passed on as a commodity demand. The latter payment may be negative – if so, the stock is reduced.

3. DATA AND STEPS FOR BUILDING THE SAM FOR KOREA

In this section, we describe the steps followed in the building of the gendered Korean SAM for 2014, designed for analysis of care policy and, more broadly, issues related to gender in Korea's economy. It has the same structure as the stylized SAM presented in Section 2 but is disaggregated in areas that are critical to our analysis. It is accompanied by time-use data, disaggregated to match the entries in the SAM for labor value-added. The procedure followed when building the Korea SAM involved the stepwise construction of three SAMs: (i) SAM0 – a basic SAM with a complete coverage of the GDP economy but not appropriate for economic analysis as is; (ii) SAM1 – a refined version of SAM0 with a treatment of the GDP domain that meets the basic needs of CGE analysis; and (iii) SAM2 – a SAM with changes in two areas compared to SAM1: disaggregation of households (on the basis of care needs) and addition of accounts to cover the household (or non-GDP) economy; and (iv) SAM3 – a SAM identical to SAM2 except for those sectors not related to the care and household economy were aggregated for the purposes of the data presentations in this paper. In this section, we overview of the procedure and the data sources. The four SAMs are found in the accompanying Excel file.

3.1   SAM0

SAM0, the initial SAM, limited to the GDP economy, draws on two main data sources, Korea's Supply and Use Tables (SUTs) (OECD 2018) for 2014 and a macro SAM, in its turn based on data in the SUTs (ensuring consistency), Bank of Korea (2018), and IMF

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part of the private sector. Algebraically, this treatment of foreign reserves (and the rest of the structure of the capital accounts in the SAM) may be derived from the consistency matrix in Agénor (2004, p. 13) by (1) aggregating the capital accounts for its private and financial sectors; and (2) separating FDI from foreign borrowing to the private sector.

(2018a, 2018b) and built drawing on the approach in Cicowiez and Lofgren (2017).[7] The SUTs were disaggregated into 63 commodities and 62 activities.[8] The macro SAM is provided in Table 3.1, transformed to have percent of GDP as its unit to make it easier to get a sense of relative magnitudes of payments. It covers the GDP sphere and is highly aggregated, having only one factor and one sector (activity and commodity). The information in the macro SAM was needed to complete the flows of institutional payments, i.e. payments to and/or from households (an aggregate non-government institution), the government and the rest of the world.[9]

In order to generate SAM0, the supply and use tables were relabeled to follow SAM conventions, the supply tables transposed (to make sure that row accounts receive payments from column accounts, not vice versa), and the tables merged into a single table, structured to form the beginnings of a complete SAM. After this the information in the macro SAM was entered into the emerging SAM. The resulting SAM, referred to as SAM0, is a 142 x 142 matrix. In the absence of programming errors and given the fact that the data inputs were fully consistent, SAM0 was balanced.[10]

SAM0 provides a complete account of the circular flow of payments in the Korean economy. However, from the perspective of the needs of most economic analysis, it has a major shortcoming: instead of being divided into labor and capital (with one or more types in each category), value-added is split into (a) compensation of employees; and (b) operating surplus and mixed-income, including the incomes of self-employed or non-wage labor. Alas, the mixing of capital and labor in one category stands in the way of understanding the dynamics of factor markets as the determinants of growth in capital

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[7] Supply tables record, in value terms, the supplies of disaggregated goods and services from domestic production activities and imports, including the impact of indirect taxes, subsidies, and trade and transport margins on supply values (at purchaser or market prices). Use tables show how these supply values are allocated between intermediate or final uses: the latter divided into private consumption, government consumption, investment (which also may be split into private and government), stock change, and exports. Value-added tables, which may be merged with the use tables, show the disaggregation of production costs into intermediate purchases, production taxes, and value-added, the latter divided into wages to employed labor; and operating surplus and mixed-income.

[8] While most activities supply multiple commodities, each activity is the main supplier of a specific commodity. The exception to this pattern is the activity is "Public administration and defence; compulsory social security", which is the main supplier of two products. At the same time, the product "social work services without accommodation" has no matching production activity.

[9] The SUTs do not include information about the distribution of factor incomes to institutions, direct taxes, and other payments received and/or paid by institutions. In other words, for households they only cover consumption; for the government only consumption, indirect taxes, and subsidies; and, for the rest of the world, only exports and imports.

[10] The accounts are made up of 62 activities; 63 commodities; 6 institutional accounts (current and capital account for the household, the government, and the rest of the world); 2 factors (labor and capital, represented by (i) compensation of employees; and (b) operating surplus and mixed-income; 1 margin account; 4 tax and subsidy accounts; 3 investment accounts (private, government, and stock change; and 1 total account.

and labor stocks are different.[11] Relative to our needs, it is also essential to extend the SAM to the non-GDP sphere, disaggregate its labor factors by gender and along other dimensions, and disaggregate activities and commodities so that they spell out sectors related to care and household economy. The construction of SAM1 and SAM2 addressed these shortcomings in a stepwise procedure, drawing on complementary data sources.

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[11] For capital, growth depends on investment and depreciation whereas, for labor, growth depends on demography. If labor is disaggregated, then other determinants may influence disaggregated growth (inside or outside the model); for example, if labor is split on the basis of educational attainment or achievement, then the functioning of the educational system is also important.

Table 3.1 Macro SAM for Korea 2014 (percent of GDP)*

	act	com	fac	hhd	gov	row	tax-dir	tax-act	tax-com	sub	cap-hhd	cap-gov	cap-row	inv-prv	inv-gov	dstk	total
act		91.2															91.2
com				50.2	15.1	49.2				0.3				27.1	2.1	0.1	144.1
fac	90.0					1.9											91.9
hhd			90.3		3.4	0.6											94.3
gov				7.6			3.6	1.1	9.1								21.4
row		43.8	1.6	0.3	0.1												45.7
tax-dir				3.6													3.6
tax-act	1.1																1.1
tax-com		9.1															9.1
sub					0.3												0.3
cap-hhd				32.6									-5.9				26.7
cap-gov					2.5						-0.4		0.0				2.1
cap-row						-6.0											-6.0
inv-prv											27.1						27.1
inv-gov												2.1					2.1
dstk											0.1						0.1
total	91.2	144.1	91.9	94.3	21.4	45.7	3.6	1.1	9.1	0.3	26.7	2.1	-6.0	27.1	2.1	0.1	

Source: Authors' elaboration.

*Notation:

act	activities (of production)	sub	subsidies
com	commodities (goods and service	cap-hhd	capital account -- household(s)
fac	factors	cap-gov	capital account -- government
hhd	household(s)	cap-row	capital account -- rest of world
gov	government	inv-prv	investment -- private
row	rest of world	inv-gov	investment -- government
tax-dir	taxes -- direct	dstk	stock change
tax-act	taxes -- activities	total	total
tax-com	taxes -- imports		

3.2 SAM1

In this step, we generate SAM1, a SAM that, within the GDP domain, meets the needs of standard CGE applications as well as the bulk the needs of our analysis, most importantly in terms of its treatment of care and labor.

First, we address labor issues, tackling the two shortcomings in SAM0 that were noted above: its value-added is split into wage labor, and operating surplus and mixed-income, i.e. labor value added is neither disaggregated and nor fully separated from the value-added of other factors.[12]

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[12] Mixed-income includes the income of non-wage labor, most importantly the labor of owners (or members of the owner's family) for unincorporated enterprises. (Cf. UN et al 2009, p. 131)

These labor issues are addressed in two steps. First, the aggregate payments to *wage* labor are disaggregated into 8 categories along 3 dimensions: gender (male, female), education level (high and low, where low is completed high school or less and high is anything more than that), and regularity of work (regular and non-regular).[13] To do this, the aggregate wage payment for each of the 62 activities in SAM0 is split on the basis of activity-specific income shares for these 8 labor types, computed from wage income data extracted from Statistics Korea (2014c). The resulting wage incomes for each labor type are passed on to the household, the sole recipient of labor income.

In the second step, labor value-added for non-wage labor was extracted from the operating surplus and mixed income aggregate and added to the wage-labor income payments generated above, thus creating labor categories that merged wage- and non-wage workers. To achieve this step, we relied on data on hours of wage labor and non-wage labor by activity, gender, and education, extracted from Statistics Korea (2014b and 2014c). Given that the hourly wages of non-wage workers by definition are not observable and thus have to be imputed, some judgement calls were unavoidable. Per se, there is no reason to expect these imputed wages to coincide with the wages of employed labor given the fact that non-wage workers may differ from wage workers in terms of tasks, job intensity, and transactions costs (lower if they spend less time and money on commuting to the workplace). After some experimentation, the imputed wages of non-wage workers were set at 75% of the non-regular wages for labor categories that otherwise were identical (by activity, gender, and education); this level of labor remuneration preserved plausible capital rents for the different activities, including agriculture, where imputed wages at 100% of the non-regular wage generated negative capital rents.[14] Computationally, the payments for non-regular workers by activity, gender, and education of SAM0 were scaled up to account for the addition of these payments to non-wage labor while remaining value-added was treated as capital rent. Payments of factor incomes to households were redistributed to balance each factor account without any change in the total factor income received by the household.

The second major shortcoming of SAM0 is related to its disaggregation of services (care and other services) that are substitutes for household-produced services in household demand. Given the envisaged analysis, our objective was to single out three sectors

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[13] Regular workers have a high degree of job security, higher wages and social benefits such as unemployment insurance and pensions (Schauer 2018, p. 5). With regard to job security, their employment is regulated by an indefinite employment contract according to which they can stay until retirement unless employers can justify earlier dismissal, which is difficult. Non-regular workers are under fixed-term contracts that, in general, may not exceed two years (Lee 2013 and 2019).

[14] The challenge of identifying a wage for self-employed workers in Korea is evident from the results produced by Guerriro (2019, pp. 11 and 20): in a cross-country study of labor shares in value-added, she generates the implausible labor share of 0.95 for Korea when she applies the assumption that all self-employed workers earn the average employee compensation. Our current treatment may be refined.

(activities and commodities): child care, elderly care, and other substitutes for household services, something that the SAM0 (and SUT) sector disaggregation does not permit. To address this aspect, drawing on Statistics Korea (2014c), we put together data on time and incomes for labor in child care, elderly care, and production of other household service substitutes, disaggregated into the same 8 types. For non-labor input costs (intermediates and capital rent), little information was available. Given this, we assumed that the care sectors followed the pattern of other service sectors for non-labor inputs while the activity for other household service substitutes (in practice likely dominated by maid services) only uses labor. (Like maid services produced by households for own consumption, any intermediate input and capital services are implicitly treated as part of household consumption.)

To bring the cost columns for these three activities into the SAM, we created a miscellaneous service sector in SAM0 that was an aggregated of all sectors that, according to our judgment, englobed the three service sectors that we aimed at singling out.[15] After this, the three service activities were imposed on SAM1 and, to retain a balanced SAM, their total was deducted from the miscellaneous service aggregate, which remained as a smaller service sector. The costs of the four service activities define the values of their supplies. Household consumption was adjusted to demand the supplies of the three household services and to balance the account for the miscellaneous service commodity. The procedure that was followed ensured that the new SAM, labelled SAM1, was balanced.

3.3 SAM2 AND SAM3-SAM FOR GENDER AND CARE ANALYSIS

In the final stage of SAM construction, two major changes were introduced into SAM1: it was extended to cover household (non-GDP) service production; and its single household was disaggregated into three types, defined to differ in care needs: households with children with head in working-age; households without children with head in working age; and households with the head above working age.

These changes and extensions require (a) data permitting the disaggregation of the aggregate household in SAM2 (its row and column) into three households; and (b) data on disaggregated household time allocation to leisure and production of household services for own consumption, all disaggregated into the 8 labor types.

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[15] More specifically, the following SAM0 (and SUT) sectors were aggregated to a single miscellaneous service sector: Human health activities (Q86); Residential care activities (Q87); Social work activities without accommodation (Q88); Creative, arts and entertainment, libraries, archives, museums and other cultural activities, gambling and betting activities (R90-R92); Sports activities and amusement and recreation activities (R93); Activities of membership organisations (S94); Repair of computers and personal and household goods (S95); and Other personal service activities (S96). As noted elsewhere, Q88 does not have any production activity, only a product. In addition, the SUT sector classification includes the sector "Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use" (T); however, both its activity and commodity accounts are empty.

To meet the needs for step (a), we constructed two tables, one for household columns and one for household rows, disaggregated into three household types and with totals identical to the single household column and household row in SAM1. These tables were based on information extracted from Korea Labor Institute (2014), Korean Women's Development Institute (2014), Ministry of Education (2014), Ministry of Health and Welfare (2014), and Statistics Korea (2014a, 2014b). After these adjustments, gaps had emerged between receipts and spending for the individual households due to gaps in the GDP sphere. To address this, GDP consumption spending was scaled to balance the accounts for the two households with smaller total GDP incomes (the elderly and the households with children). After that, the commodity accounts were balanced via adjustments in consumption spending for the largest households (without children with head in working age). After these adjustments, the first version of SAM2 was fully balanced.

Step (b) required the definition of imputed values – the product of time in hours and hourly wages – for household time spent on activities related to leisure and service production for own consumption. These activities were not only split into child care, elderly care, and other services but also by household type. Similarly, the labor accounts to which these activities are linked are also disaggregated by household type (in addition to gender, education, and regularity). The addition of the household dimension to the activity and labor disaggregation is necessary to make sure that, in a simulation setting, household demands for services produced for own consumption indeed are produced using labor from the same household.

Turning to data, time use for these activities was extracted from Statistics Korea (2014d). For leisure, economic principles suggest that the hourly wage should reflect opportunity cost; for each household, the selected measure was the average hourly wage for its labor incomes, disaggregated by gender, education, and regularity. For service production, the wages were defined to capture the cost of replacing an hour of family labor with an hour of hired labor providing the market substitute, here using the average hired labor wage instead of wages disaggregated by gender, education, and regularity – i.e., to exemplify, the cost of the hired labor that could replace family time spent on child care is defined so that it is independent of the level of education or other characteristics of the family care provider. For these services, labor was treated as the only cost item, i.e. costs of intermediate and capital use were not accounted for. Any such spending would instead be treated as household consumption.

Once these new activity columns had been defined (reflecting imputed labor costs), it was straightforward to bring the SAM back into balance: the activity column totals were used to define the supplies of their output commodities (thus generating balance in the activity accounts). For the commodities, the consumption of each household was defined to absorb the new supplies for its own consumption, thus balancing these accounts as well. At the same time, the payments from the new activities to household-specific labor categories were passed on as income to the households, generating balance, not only for

the labor accounts but also for the household accounts since, by definition, their income and consumption increases were identical.[16]

Finally, to facilitate the presentation in this section, SAM3 was created: it differs from SAM2 in that sectors not related to care or household services were aggregated to the top level of the ISIC (International Standard Industrial Classification) Revision 4 (UN 2008, p. 43). As a result, the number of sectors (with each sector represented by an activity and a commodity account) fell from 71 to 32. The time-use data were aggregated in the same manner.

4. A SAM-BASED DESCRIPTION OF CARE, GENDER AND ECONOMIC STRUCTURE

Drawing on SAM3, a gendered Korea SAM and accompanied by data on time use with the same activity disaggregation, this section describes selected features of Korea's economy with a focus on care and gender aspects. While the presentation is limited to a simple description of the information, it nevertheless demonstrates that SAMs contain a wealth of information about an economy, with the details depending on the focus and disaggregation of the SAM.

The information is displayed in a set of figures that summarize data related to value-added, time use, wages, and household characteristics. Figure 4.1. shows the distribution of value-added across both GDP and household (or non-GDP) production. For the disaggregation that is used, manufacturing is the largest sector by a wide margin, followed by a set of service sectors, among which household non-care services are the largest. At a more aggregate level, the GDP economy is 86 percent of the total (with agriculture, industry, services accounting for 2, 33, and 51 percent, respectively) and the non-GDP economy 14 percent, using rounded numbers here and in the rest of Section 4. (Alternatively, it could be said that the size of the non-GDP economy amounts to around 16 percent of the GDP economy.) This information may be contrasted with aggregate time shares – Figure 4.2 -- in terms of which, the non-GDP economy accounts for a much larger share, 40 percent, with sharp differences between men and women.

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[16] Disaggregating leisure by labor type

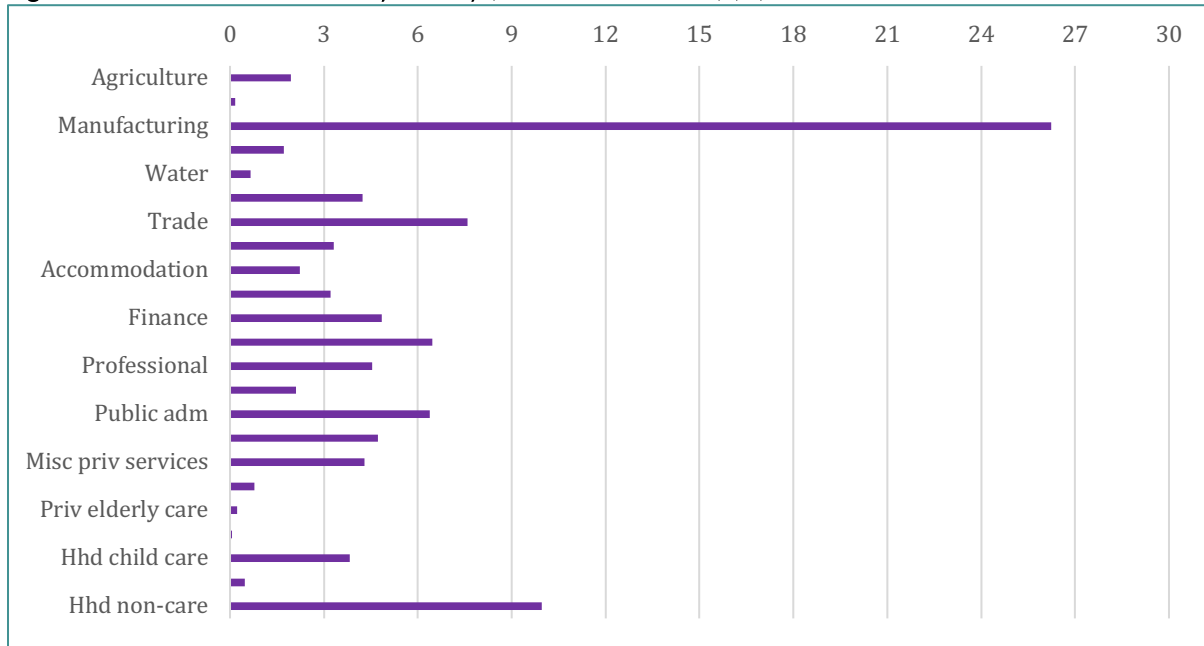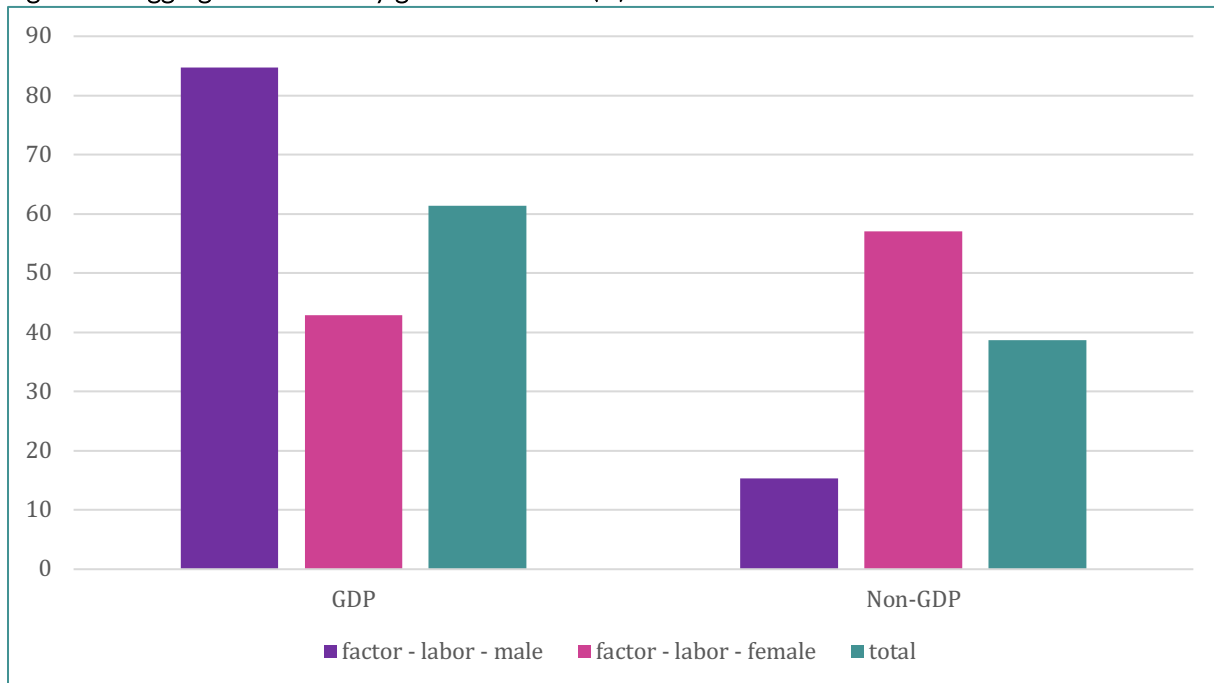Figure 4.1 Value-added shares by activity (GDP and non-GDP) (%)

Figure 4.2 Aggregate time use by gender and total (%)

Note: Total by gender is 100%

The gaps between data underpinning Figures 4.1 and 4.2 in terms of GDP and non-GDP shares are due to lower imputed wage levels for the household economy and the fact that, by assumption, its capital rents are zero. The share of time allocated to household activities are drastically different for men and women, 15 and 57 percent, respectively. Figure 4.3 shows a finer disaggregation of the underlying data for each gender group: for women, non-care household services is the largest time using activity by a wide margin, followed by household child care, trade services, and hotel and restaurant. For men, manufacturing dominates, followed by trade services, household non-care services, and construction.

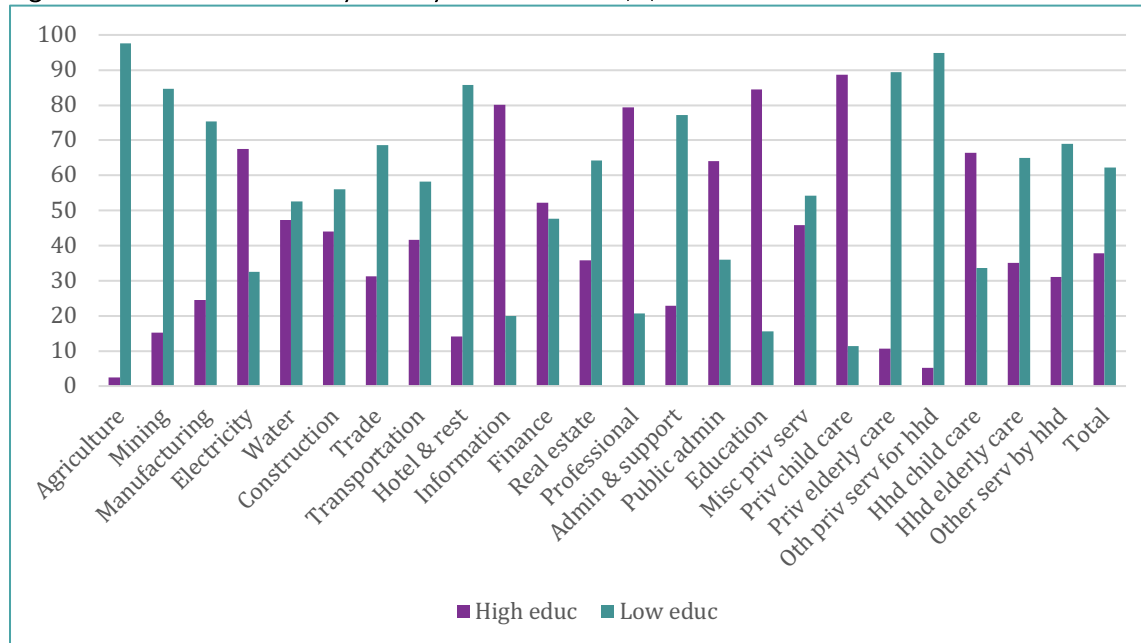Figure 4.3 Time use by activity and gender (%)
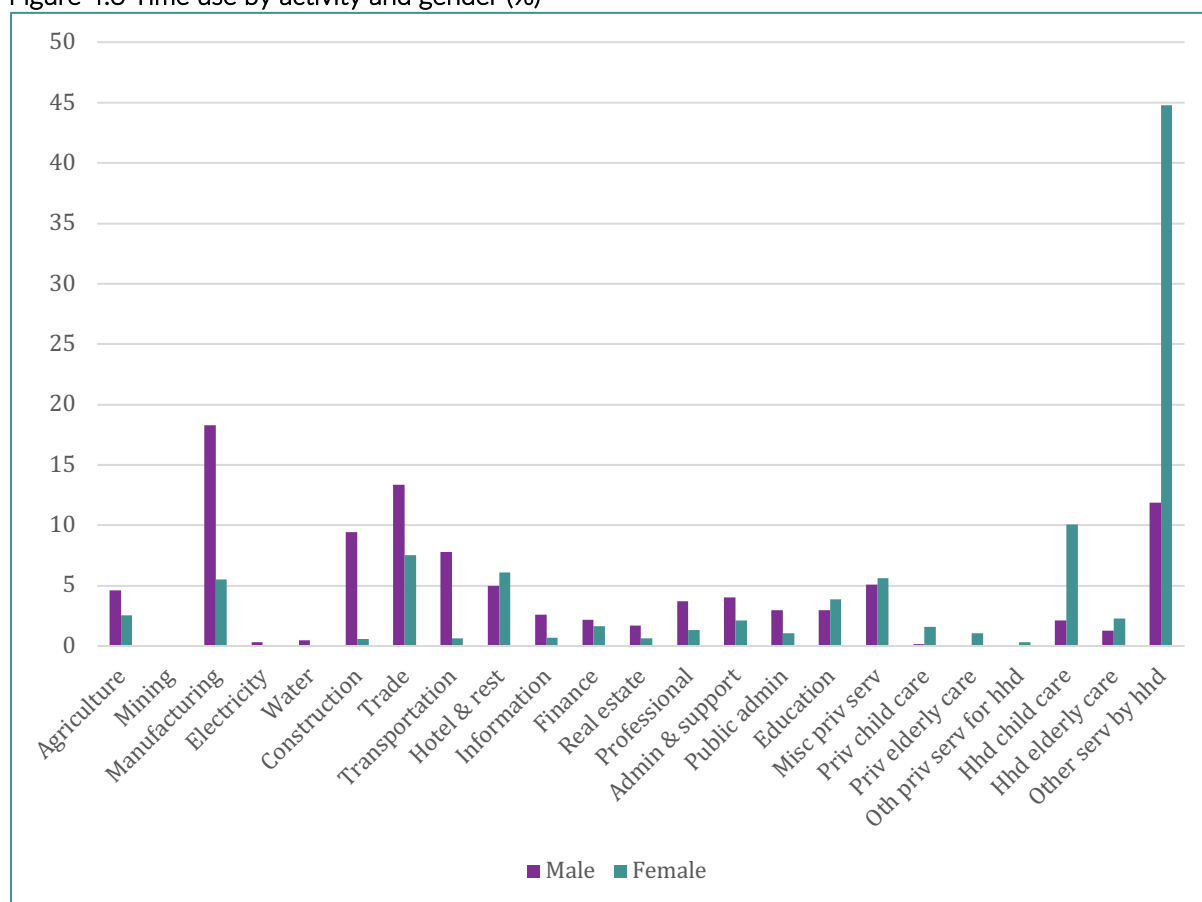
Note: Sum of GDP and non-GDP by gender and total is 100%

Alongside with activity and gender, time use is disaggregated by education and regularity of work. Figures 4.4 and 4.5 show female and male high and low education shares in different activities, with each activity summing to 100 percent. For the economy as a whole, the female high and low shares are around 38 and 62 percent while the male shares are 45 and 55 percent. The two genders here follow similar patterns: for agriculture and industry, the lesser educated dominate all activities except electricity for

both men and women. For services, the differences across sectors are drastic with some dominated by those with high education and others by those with low (cf. information and hotels and restauration services). However, the ranking between high and low education shares is the same for men and women in all sectors except the residual sector miscellaneous private services.

Figure 4.4 Female time use by activity and education (%)

Note: For each activity total is 100%

Figure 4.5 Male time use by activity and education
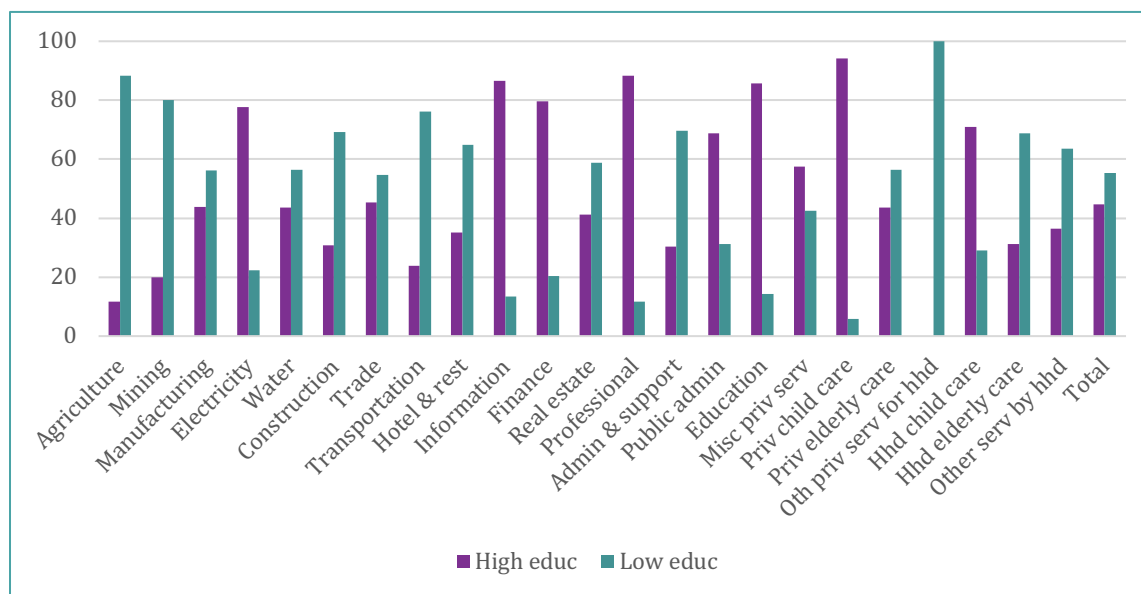
Note: for each activity, total is 100%

Figures 4.6 and 4.7 compare female and male shares in different activities in terms of whether work is regular or non-regular, with the latter group including all non-regular wage employees and all non-wage (or self-employed) workers. [17] This time, the comparison is limited to the GDP economy. In terms of regularity, agriculture stands out as the only sector that primarily is non-regular (due to non-wage employment). Industrial sectors are mostly regular. Services are mostly primarily regular but there are some exceptions. Also, in this case, the male and female patterns are very similar: their activity-level regular – non-regular ranking are the same except for transportation (where women are primarily regular but very few – cf. Figure 4.3) and elderly care (where men are primarily regular but also relatively few).

Figure 4.6 Female time use by GDP activity and regularity (%)

Note: For each activity, total is 100%

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[17] Throughout this section, it is important to keep in mind that the data are influenced by this definition of non-regular workers and the fact that the imputed wage for non-wage workers is set to 75 percent of the non-regular wage for workers that otherwise (by gender, education and activity) belong to the same category. At least for descriptive purposes, it may be useful to split the non-regular and self-employed into separate groups.

Figure 4.7 Male time use by GDP activity and regularity (%)
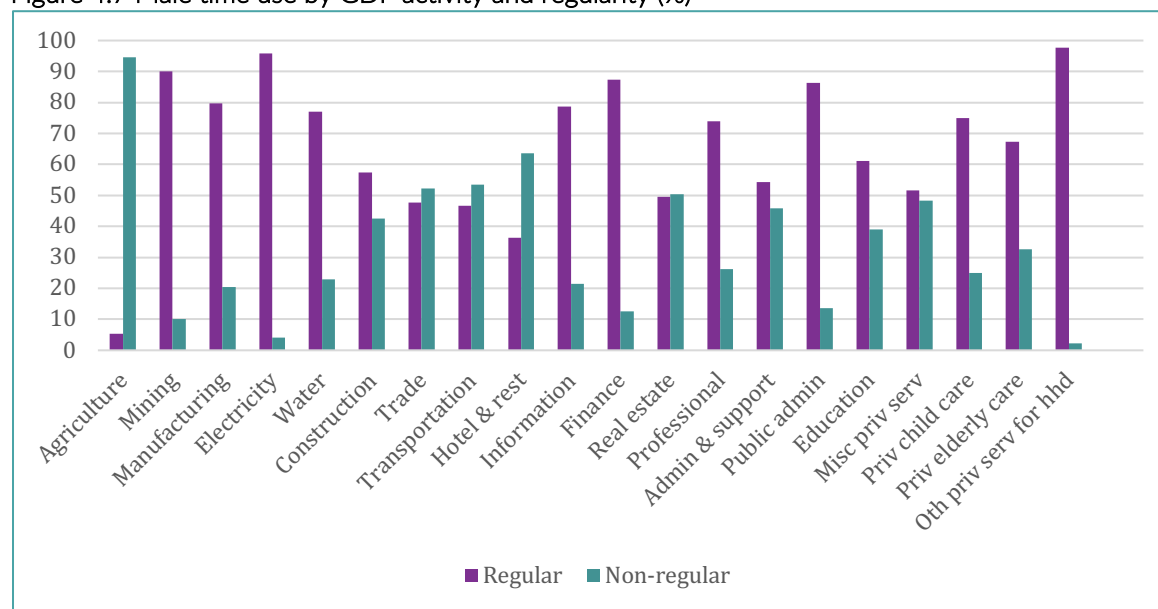
Note: For each activity, total is 100%

Disaggregated wages may be generated as the ratio between SAM payments to labor and matching information about time use. Figures 4.8-4.12 review wage data for GDP employment disaggregated along different dimensions. (Wages for non-GDP employment are of less interest since they simply are the average wage in the matching GDP sector.) In all figures, the wages are indexed to the average wage across all GDP activities and labor types, which is set at 100.

Figure 4.8 indicates that the average wage is highest in mining (where, alas, very few work), followed by public administration and electricity. At the other end, the lowest wages are in private elderly care and other private services for households (such as cleaning). Instead of disaggregating by activity, Figure 4.9 computes the wage for 23 different labor groupings – the 8 types used in the analysis (by gender, education, and regularity) and different aggregations of these types.

At the aggregate level, the ratio between male and female wages is 1.59, i.e. men earn on average almost 60 percent more per hour. Still, at the aggregate level, the high – low education and regular – non-regular wage ratios are 1.92 and 1.86, respectively. While male wages are above female wages for all male-female pairings, the extent to which this is the case varies quite drastically between the different pairings. At the most disaggregated level in this figure, the male-female wage ratio is largest among regular workers with low education (1.77) and the smallest among non-regular workers with high education (1.08). The other two gender wage ratios (high education regular and low education non-regular) are slightly below the average (1.53 and 1.47, respectively).

Figure 4.8 Average wage by activity (GDP work; average = 100

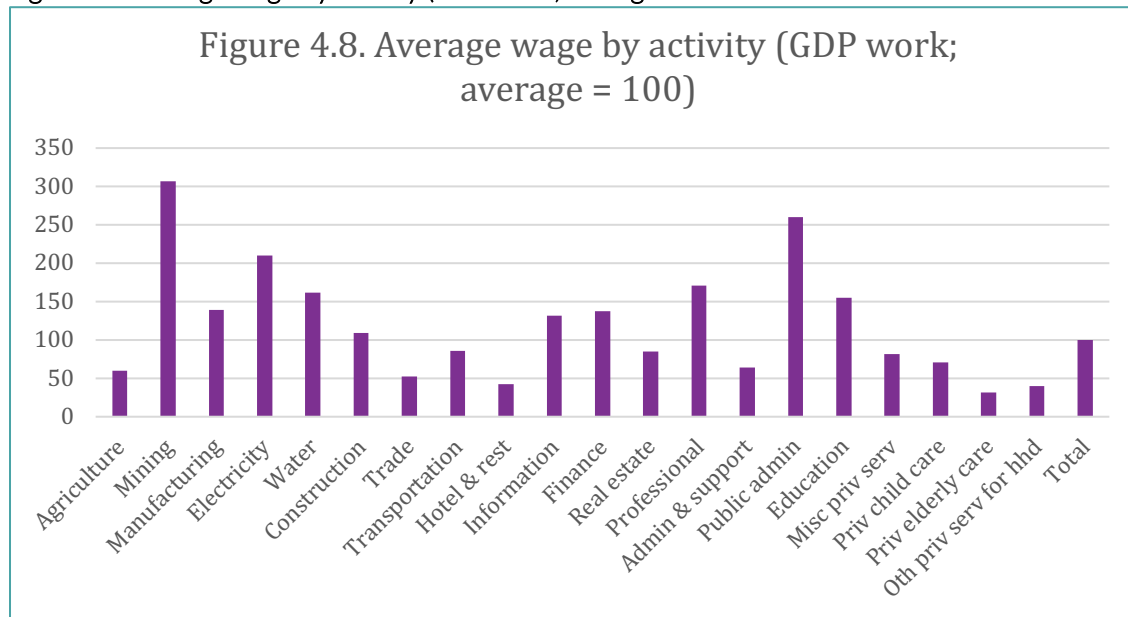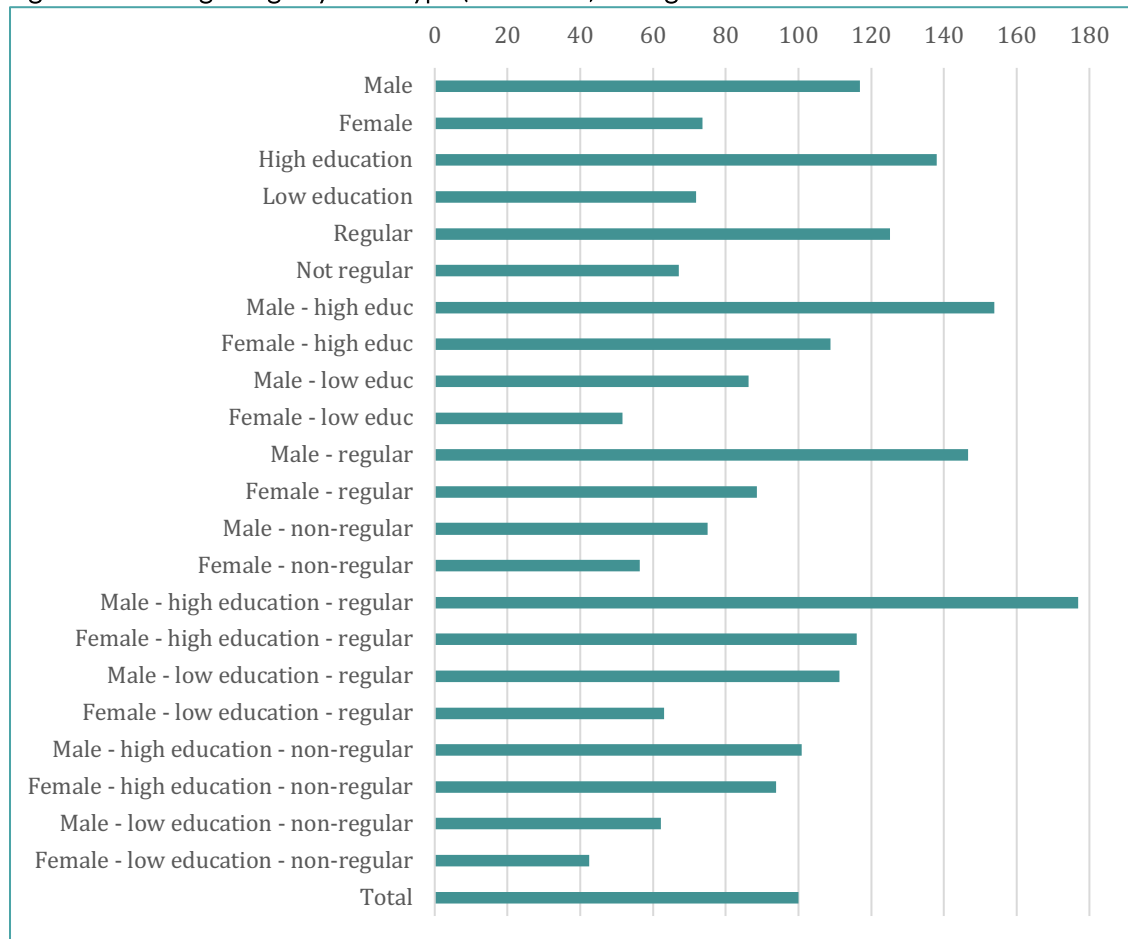Figure 4.8. Average wage by activity (GDP work; average = 100)

Figure 4.9 Average wage by labor type (GDP work; average = 100

Figures 4.10-4.12 looks at wage gaps at the activity level by gender, education, and regularity, respectively. With regard to gender – 4.10 --, the three highest male-female wage ratios are, in order, in finance, professional services, and manufacturing. At the other end, the lowest ratios are for other household services, transportation, and administration and support services (a heterogeneous aggregate of business and business support services). Across all activities, the average for those with a high education is higher – see Figure 4.11. The relative gaps are particularly high in some of the service sectors (the heterogenous administration and support services, miscellaneous private services, and professional services) and the lowest in mining, private child care, and hotels and restaurants. As mentioned, the economy wide average wage gap between regular and non-regular workers is 86 percent. Figure 4.12 adds further details at the activity level. Regular worker wages on average are higher in most activities, with the strongest premium for regular employment in agriculture, public administration, and trade. However, in contrast with this general picture, the non-regular workers in three activities (other private services, elderly care, and mining) collect wages that are higher than or near-identical to their regular counterparts.

Figure 4.10 Average wage by activity & gender (GDP work; average = 100)

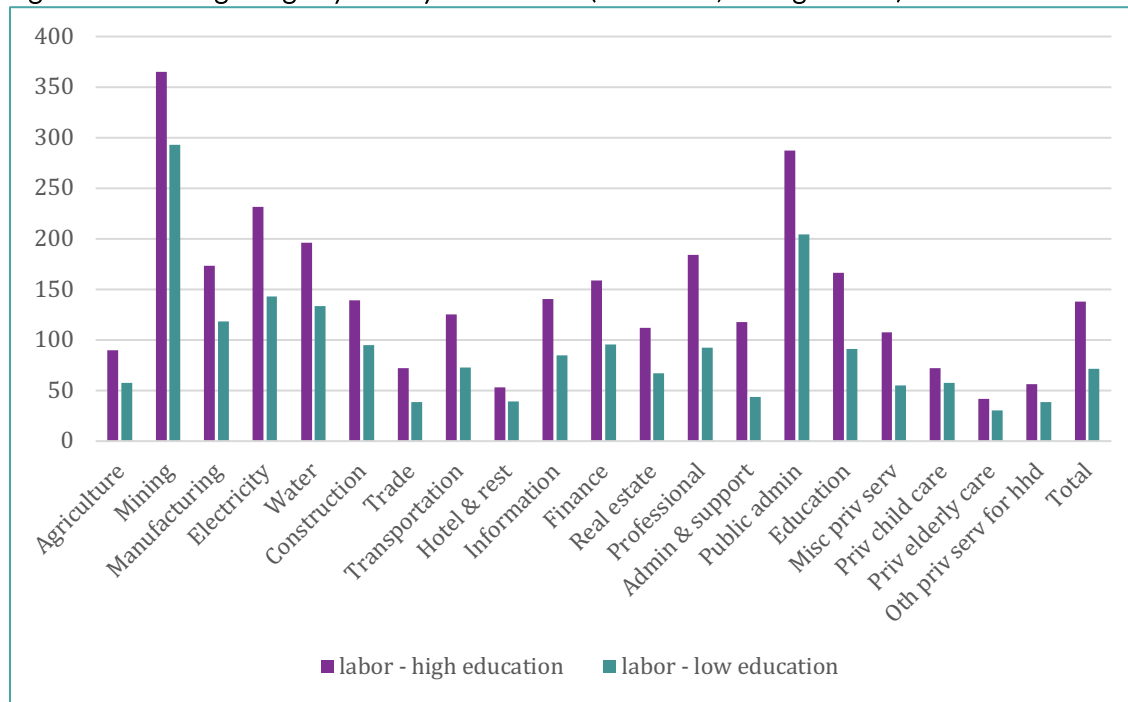Figure 4.11 Average wage by activity & education (GDP work; average = 100)

Figure 4.12 Average wage by activity & regularity (GDP work; average = 100)

Finally, Tables 4.1-4.3 and Figure 4.13 summarize data related to the households: population, incomes, and spending. As shown in Table 4.1, out of the total 2014 population of close to 50 million, more than half live in a family with a head in working age and without children. Around one third are in a household with children is in households with a head in working age with children while the rest, some 10 percent, are elderly. In terms of per-capita consumption, the elderly have the highest per capita level (although their consumption is in part supported by lower savings rates).

The household groups were constructed to differ in age composition and, as a consequence, in care needs. Table 4.2 shows that, in the elderly group, more than 90 percent are 65 years or older while the number of children is negligible. Among the household with children, 47 percent is below 18 and 51 percent in working age. In the working households without children, 77 percent are aged 18-64, although they do also include some aged 10-17 and 65 and older.

The differences in demographics are also reflected in differences in income sources – see Figure 4.13. While the working households rely on labor for some 60 percent or more of their incomes, the elderly only get 5 percent of their incomes from this source, instead of relying on capital for more than 80 percent of their earnings. Apart from labor and capital, transfers from the government are also of some importance, especially for the elderly (who receive government pensions), for which they account for around 10 percent of the incomes.

Finally, the household also differ in terms of spending patterns, especially in care related services. In Table 4.2, spending is defined broadly to include the imputed values of household services. For a household with children, child care, thus defined, is the major spending item, with a particularly large component of services provided by own household members. Across the households, spending on elderly care is low, both purchased and provided within the household sector. For other services produced by households but with market substitutes, the share purchased from the market is very low while the value of the services the households generated for their own consumption is important, on average representing 16 percent of total household consumption.

Table 4.1 Summary of household population and consumption data

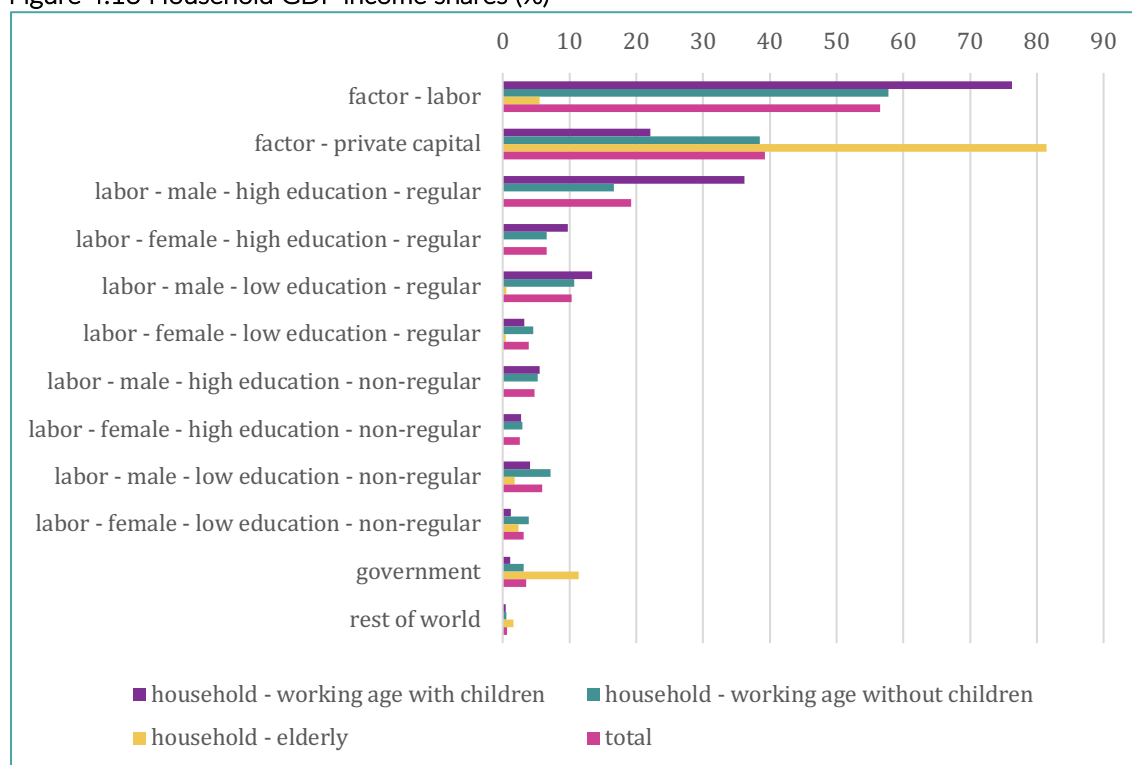| | Household group | | | |
	Working with children	Working without children	Elderly	Total
Population	16.4	27.1	5.3	48.8
Consumption	233.6	595.5	139.8	968.9
Consumption per cap.	14,254	21,984	26,351	19,862
Units: millions for population, billion wons for consumption, wons for per-capita consumption				

Table 4.2 Household population by household type, age, and gender

| | Household with … | | Elderly head | All |
| | Working-age head | | | |
Group	w/ children	w/o children		
Millions				
Total	16.4	27.1	5.3	48.8
Male	8.2	12.9	2.1	23.1
Female	8.2	14.2	3.2	25.7
Male -- 0-9 years	3.4	0.0	0.0	3.4
Female -- 0-9 years	2.9	0.0	0.0	2.9
Male -- 10-17 years	0.6	2.1	0.0	2.7
Female --10-17 years	0.7	1.9	0.0	2.6
Male -- 18-64 years	4.0	9.9	0.0	13.9
Female -- 18-64 years	4.4	11.1	0.4	15.9
Male -- 65+ years	0.2	0.8	2.1	3.1
Female -- 65+ years	0.2	1.3	2.8	4.3
%-age gender and age composition by household				
Total	100.0	100.0	100.0	100.0
Male	49.8	47.5	39.2	47.4
Female	50.2	52.5	60.8	52.6
Male -- 0-9 years	20.8	0.0	0.0	7.0
Female -- 0-9 years	17.8	0.0	0.0	6.0
Male -- 10-17 years	3.7	7.9	0.1	5.6
Female --10-17 years	4.2	6.9	0.0	5.3
Male -- 18-64 years	24.3	36.5	0.1	28.5
Female -- 18-64 years	26.8	40.9	7.9	32.6
Male -- 65+ years	1.0	3.1	39.0	6.3
Female -- 65+ years	1.3	4.7	52.8	8.8

Table 4.3 Household consumption share (GDP and non-GDP) (%)

	Household group			
	Working with children	Working without children	Elderly	Total
Agriculture	1.6	2.7	2.5	2.4
Mining	0.0	0.0	0.0	0.0
Manufacturing	17.5	29.5	27.0	26.3
Electricity	1.5	2.5	2.3	2.2
Water	0.3	0.6	0.5	0.5
Trade	0.5	0.9	0.8	0.8
Transportation	1.9	3.2	2.9	2.8
Hotel & rest	4.1	6.9	6.3	6.1
Information	2.1	3.6	3.3	3.2
Finance	3.7	6.2	5.7	5.5
Real estate	7.1	12.0	11.0	10.7
Professional	0.2	0.3	0.3	0.2
Admin & support	0.4	0.7	0.7	0.6
Public admin	0.1	0.1	0.1	0.1
Education	4.0	6.7	6.1	6.0
Misc priv serv	6.5	6.7	9.1	7.0
Priv child care	7.9	0.0	0.0	1.9
Priv elderly care	0.1	0.8	0.2	0.5
Oth priv serv for hhd	0.3	0.0	0.1	0.1
Household care of children	25.5	0.0	0.0	6.2
Household care of elderly	0.7	0.8	0.6	0.8
Household non-care services	14.2	15.7	20.5	16.0
Total	100.0	100.0	100.0	100.0

Figure 4.13 Household GDP income shares (%)

Legend:
- household - working age with children
- household - working age without children
- household - elderly
- total

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