The effects of minimum wages on the labor market and income distribution in Kenya: A CGE analysis

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Abstract

In Kenya, there has been increased debate on the impact of minimum wage increases and pay disparities between sectors. Long-term differences in earnings across sectors and different regions (urban and rural) are reflected through higher poverty rates in rural areas, especially among wage earners. This study evaluates the effects of minimum wages on labor and its impact on growth. The study uses the single country static model, the PEP-1-1 model and the Social Accounting Matrix for Kenya for the year 2009. The key research questions are to assess the effects of minimum wages on rural or urban area labor markets, labor migration, and income distribution. To achieve this, the study simulates three scenarios: increases in minimum wages for formal workers in urban and rural areas at the same rate of 5%, different rates (10% rural and 5% urban), and a cut in the minimum wages in both regions. The findings indicate that increases in wage fuel the migration of labor from rural to urban areas, and stifles the expansion of the economy. A rise in minimum wages has an overall negative effect on incomes of rural households while benefiting urban households, which contributes to increased inequality. A fall in real minimum wages on the other hand, is supportive of output and employment growth.

Keywords: Minimum wage, labor market, migration, income distribution, CGE
JEL: C68, J38, J61, E64

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I.   Introduction

1.1 Context of the study

In Kenya, minimum wages can be traced back to 1972 through the minimum wage regulation and wage guidelines (Republic of Kenya, 1973). Minimum wages have been regulated through the general, agricultural and sectoral wage councils. The wage councils, which are advisory in nature, are constituted by the Minister for labor. Labor market policies and institutions are recognized as an integral part of ensuring growth and equity in the remuneration of workers. Minimum wages act as a means of reducing the risks faced by formal workers by broadening access to social protection, and they also indirectly affect informal sector workers, through changes in labor demand. In Kenya, the minimum wage is set according to location and industry of employment. The General Wages Order guidelines contain minimum wage levels for 15 occupational categories, with different rates of pay for cities, municipalities and all other towns (Republic of Kenya, 2009). This implies there are 45 sets of minimum wages under this Wage Order. On the other hand, the Agricultural Order, contains minimum wages for 11 different occupations (Republic of Kenya, 2009). It is worth noting that the agricultural sector provides employment to over 70% of the total employment in rural areas while in urban areas, most employment is in the services and industrial sectors. To ensure policy relevance given the current setting of wages according to location and sectors, this study adopts a regional (urban versus rural) and sectoral approach between agricultural and nonagricultural activities (industry and services).

The labor structure across sectors has also ensured that the minimum wage policy may benefit workers in some sectors while for others there may be no change or they may experience negative effects from changes in the policy. For example, the setting of the minimum wage by occupation and industry based on location are reviewed regularly in Kenya, with higher growth in minimum wages for agricultural sector workers compared to those in industry (Republic of Kenya, 2015). However, this has not reduced labor migration from rural to urban areas in search of higher wages. Nevertheless, high rates of rural-urban

migration often create pressure on available employment opportunities and the provision of social services.

Unlike rural areas where agriculture is the dominant economic activity, industry and service sectors are dominant in urban areas. However, the lower employment opportunities in urban areas often lead not only to higher rates of frictional unemployment, but also higher incidences of poverty for poor urban households compared to rural households, the main reason being the migration of labor from rural areas. The inability to find employment in the formal sector for migrants implies that the majority of them have to find work in the informal sector. This means that some migrant workers in the urban labor market may experience unstable employment status and relatively lower incomes than if they were in rural areas, as well as, higher inequalities.

Kenya Vision 2030, the long term development strategy, aims to create more than 700,000 jobs annually as part of its socio-economic program (Government of Kenya, 2007). The sectors that are expected to support the country's vision and growth agenda, and hence, create employment are mainly industrial sectors of manufacturing, agriculture, and service sectors of wholesale and retail trade, information and communication technology (ICT) and financial services. These sectors are subject to the minimum wage policy, through which the government aims to ensure a dignified wage for the Kenyan workers. However, firms are opposed to frequent revisions of the minimum wage on basis that they increase operational costs. Therefore, the challenge exists between balancing supporting growth whilst ensuring equitable pay and poverty reduction across all regions.

Informality, as defined by the International Labor Organization (ILO) includes workers who are characterized by the lack of social security, poor working conditions, low wages and low levels of productivity for firms. On the other hand, employers range from those involved in the activities of unregulated firms and salaried workers to undeclared or unpaid employment. In Kenya, informal employment is estimated to account for a disproportionately large proportion of workers. Projections on employment creation by type based on the country's historical employment data (2001-2012) show that formal employment will exceed 2 million jobs after the year 2012 to an estimated 3.8 million jobs by the year 2030. Informal sector jobs are predicted to increase from around 11 million jobs in 2012 to 21 million (almost double) by the year 2030. The country's labor force is

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predicted to increase from about 16.5 million in 2012 to approximately 26.7 million in 2030. While the unemployment gap is predicted to narrow down over time, the formal employment gap appears to widen over time. This indicates that informal jobs will grow at a faster rate than the rate of creation of formal sector jobs. The prediction shows that total employment (formal and informal) will increase from about 12.6 million in 2012 to about 25 million by 2030, but the bulk (84 %) of these jobs will be in the informal sector (Republic of Kenya, 2015; Government of Kenya, 2013).

The earliest comprehensive study on employment and inequality in Kenya in 1972 showed that urban unemployment could be explained by the fact that minimum wages in urban areas exceeded all groups (wage employees in rural areas, large and small farms and non-agricultural enterprises) except the owners of non-agricultural enterprises (International Labor Office, 1972). This is due to the enforcement of the minimum wage in urban areas notably in the manufacturing sector which led to high wage differentials when compared with the agricultural sector. This is supported by Andalon and Pages (2008) whose findings on labor market outcomes in Kenya indicate that minimum wages have a positive effect on incomes of workers and women in the non-agricultural sectors (manufacturing). The higher minimum wages in urban areas have been identified as a one of the contributing factors to rural-urban migration in developing countries. This is supported by other labor statistics which indicate that although the size of wage employment in rural areas is rising to an estimated 15.6 %, informal urban employment is rising faster and is estimated at over 70 % of total employment (Republic of Kenya, 2013).

Migration of labor can also partly be attributed to insufficient support extended to agricultural production and low prices for farm produce. The movement of labor is explained by the availability of greater opportunities in urban areas with the most educated workers migrating in search for jobs (Kenya National Bureau of Statistics, 2012). However, various initiatives have emerged to address rural development and employment creation to reduce rural-urban migration. There has also been a shift towards the development of technology that will use resources including local materials and labor. The introduction of fertilizer subsidies in the country aims to not only to increase agricultural production, but also to increase employment and reduce poverty through increased food security.

The increasing urbanization, which has risen to a high of 40 % for in-migration for major urban areas, is seen as a hindrance towards the location of production in the rural areas. Kenya's rural industrialization strategy has not made progress for a long time and, therefore, there is a recognized need for increased investment at the rural levels, increased employment opportunities and the reduction of rural-urban migration (Republic of Kenya, 2011). In this study, the migration of interest is from rural areas to urban areas. The definition of urban and rural areas is determined by population concentration. Areas with a population of more than 2,000 are considered urban while those with less are categorized as rural.

1.2 Research questions and objectives

This study seeks to evaluate responses of the labor market, and sectoral and economic responses to increases in minimum wages in Kenya. Given the relative importance of the agricultural sector in the Kenyan economy, the study generally seeks address whether the minimum wage policy is a hindrance to the agricultural sector's growth through lower wages and labor supply to the sector. Similarly, it investigates the effect of the wages on other sectors and the labor market. Specifically, the study seeks examine whether there is an optimal growth in minimum wages that supports growth and reduces inequality that exists between households in urban and rural areas.

The specific research questions are:

- How do the minimum wage increases affect labor migration between urban and rural areas?

- What is the impact of the differential minimum wage increases on income distribution and poverty in Kenya?

II.   Literature review

Empirical studies have identified two effects of minimum wage policies: a distribution effect and an employment effect. With regards to the distribution effect, Fields and Kanbur (2007) found that poverty can actually decrease, increase or remain unchanged depending on the degree of poverty aversion, the elasticity of labor demand, the ratio of the minimum wage to the poverty line, and the extent of income sharing. Studies from Latin America and developing countries from other regions indicate that poverty falls as the minimum wage rises (Lustig and McLeod, 1997; Morley, 1995). Neoclassical theory predicts negative effects on overall employment and an increase in average wages as a direct consequences of an increase in the minimum wage. The standard two-sector model, one covered and one uncovered, dictates that raising the minimum wage reduces employment in the covered sector, creates unemployment, and eventually pushes the workers to find employment in the uncovered sector, which in turn has a negative effect on the low wage earners. The impact of a minimum wage in the presence of a high informal sector is mixed. Some studies have found that a minimum wage in the formal sector provides a signaling (lighthouse) effect to the informal sector, leading to increased informal sector wages (Boeri, Garibaldi, & Ribeiro, 2010). On the other hand, other studies have found that if minimum wages are enforced only in the relatively high-wage urban formal sectors, they are unlikely to help workers in the parts of the economy where most of the poor are found (the rural and urban informal sectors) (Gindling and Terrell, 2004; Harrison and Leamer, 1997).

In a review of the literature of segmented labor markets and differentiated wages, Boccanfuso and Savard (2011) found that wage gaps between the formal and informal sector can also partly be explained by minimum wages that are set above the equilibrium level, the activities of trade unions, and rules and regulations that introduce rigidities in the labor market. Similarly, Agénor and Aynaoui (2003) find that a cut in the minimum wage for unskilled formal labor, can lead to a reduction in unemployment in the short term, and that the process of adjustment in the labor market often involves rural to urban migration, and formal-informal adjustments in labor supply. This is also reported by Schultz (1982) who found that for the less educated groups, the wage gap is a major determinant of urban labor force growth and inter-regional migration

III.   Methodology and data

The study adopts the single-country static *PEP-1-1* Computable General Equlibrium (CGE) model by Decaluwe, Lemlin, Maisonnave, and Robichaud (2012) which is modified to fit the study. A CGE model is appropriate for this study as is allows for the assessment of economy-wide effects of minimum wages. This section presents the adjustments made to the *PEP-1-1* model with regards to the labor market. The model adjustments in the labor market follow the characteristic of the Kenyan labor market with respect to the application of the minimum wage policy. The main aspect of the study assesses the implications of the minimum wage on the labor market, migration of labor from rural to urban areas, and income distribution. The study uses a 2009 social accounting matrix (SAM) for Kenya. A 2009 SAM developed by the Kenya National Bureau of Statistics (Kenya National Bureau of Statistics, 2015) was modified to include 36 activities, 18 for rural and 18 for urban areas based on the International Standard for Industrial Classification (ISIC). The activities that constitute the public sector include; public administration, education, health and social work. The contribution to value added by various economic activities shows the divergence between urban and rural areas. The production of subsistence agriculture, other agricultural activity, and public services contribute the most to rural GDP at 17.3 %, 10.9 %, and 12.8 %, respectively. In urban areas, public services, real estate, and accommodation and food service activities contribute 15.2%, 15.1% and 11.0 %, respectively. Labor is disaggregated by region and nature of employment (formal and informal). There are four labor categories; formal rural, formal urban, informal rural and informal urban. Informal employment is defined as employment that does not have social security. There is a mix of both formal workers targeted by the minimum wage policy across all economic activities in both urban and rural areas.

3.1 Production structure

The production activities are spilt between urban and rural areas. The distribution of economic activity by region shows that there is minimal agricultural activity in urban areas, while industry and services are high. However, there are substantial non-agricultural

economic activities in rural areas in the service sectors. The modeling is approached in two steps: the regional aspect of the labor market and the specification of a migration equation. The adjustments made to the standard *PEP-I-1* model are as follows: to address the spatial dimension of application of the minimum wage, labor has been categorized into urban and rural, and by formality, that is formal and informal labor. Economic activities have further been distinguished between rural and urban, and public and private activities. The total labor supply in urban area activities, $LSTU$, and for rural areas activities $LSTR$, is the sum of labor supply in the public $LSpub,_j$, and private sectors $LSpri,_j$ for each category of labor j.

3.2 Labor, unemployment and migration

Unemployment is calibrated as a sum of 9.2 % of total urban formal labor supply, which is the estimated unemployment rate in Kenya, and a proportion of the volume of migrant labor to urban areas, which is estimated at 10%. The total volume of migrants is an estimated 3% of formal workers in rural areas, while the share in the volume of unemployed is fixed at 10% of total migrants. The rationale is that as migrants enter the urban labor market targeting formal employment in the private sector, a share of the migrants are unable to immediately find work due to the resulting oversupply of labor in urban areas, and, hence, increase the volume of the unemployed. The implications on the supply of labor in the formal private sector in urban areas, LSTU_{for}, is that it includes the sum of labor demand, migrants, Migr, and the volume of the unemployed, CH. With a fixed supply of labor, the introduction of a minimum wage creates unemployment in the formal urban labor market. The adjustments in the labor market have been inspired by van der Mensbrugghe (2005). The equilibrium conditions in the urban labor market for the private sector are as follows:

$$LS_{pri,forurb} - \sum LD_{pri,forurb} \ = \ CH \ + \ Migr$$

$$LS_{pri,infurb} + CH \ + Migr = \ \sum LD_{pri,infurb}$$

The equilibrium conditions in the rural labor market for the private sector are as follows: the supply of formal rural labor in private sector, less the demand for labor in the

private sector is equal to the volume of migrant labor to urban areas, $Migr$. While the volume of migration is determined by changes in labor demand and labor supply of formal rural workers in the private sector. These are represented as follows:

$$LS_{pri,forrur} - \sum LD_{pri,forrur} = Migr$$

The migration function is a function of wage rates in the formal urban labor market and the total supply of labor in the urban labor market (sum of LSTU$_{INF}$ and LSTU$_{For}$). The migration of labor is affected by changes in the wage rate for the formal urban labor market, whereby an increase in the formal urban minimum wage has an initial demand and the supply of labor in each region.

$$Migr^i = Migr^o \left[1 + \left\{\left(\frac{\sum LD^i{}_{pri,forurb}}{\sum LD^o{}_{pri,forurb}}\right)\left(\frac{W^i_{pri^i,forurb}}{W^o_{pri^o,forurb}}\right)\left(\frac{LSTU^o_{inf^o} + LSTU^o_{for^o}}{LSTU^i_{inf} + LSTU^i_{for}}\right)\right\} - 1\right]$$

A higher increase in the minimum wage in urban areas pulls workers to urban areas, increasing $LS_{pri,forurb}$, and the volume of the unemployed. It does, however, raise wages in rural areas, while having a downward effect on urban wages.

3.3 Simulation set up

Minimum wages are regularly reviewed and adjusted based on locality, often with differences between rural and urban areas. Table 3.1 shows the trend in real minimum wages from 2003 to 2015. Increases in real minimum wage during this period have ranged from a decline of 13.1 % in 2013 for both urban and rural sectors areas, to increases of up to 13.4 % for the urban industry. The upward and downward changes over the reviewed period averaged 5.5%. The simulation set up in the model is to increase and decrease the formal labor wage rates in urban and rural areas at different scopes, based on the history of changes in the minimum wage. Due to the high variations in the minimum wage changes, for simplicity, we adopt changes of 5% and 10%.

Table 3.1: Changes in minimum wage[1] levels

| Year | Urban-Industry | | Rural-Agriculture | |
	Nominal wage (KSh)	Growth in Real wage	Nominal wage (KSh)	Growth in Real wage
2003	3,905	1.1	2,529	4.7
2004	4,335	-0.7	2,870	1.5
2005	4,638	-2.6	3,060	-3.0
2006	5,195	5.6	3,396	4.7
2007	5195	-4.1	3,396	-4.1
2008	5,195	-13.1	3,396	-13.1
2009	6,130	6.7	4,076	8.6
2010	6,743	13.4	4,483	5.7
2011	7,586	-8.2	5,044	-1.3
2012	8,579	3.4	5,704	3.4
2013	9,781	7.8	6,503	7.8
2014	9,781	-6.4	6,503	-6.4
2015	10,955	5.1	7,284	5.1

Source: Own computation from economic survey, various issues
[1] Minimum wage levels adjusted for inflation; 2002=100

In the first simulation, an increase of 5% is simulated for both the formal rural and urban labor categories, henceforth denoted as simincr). This simulation is able to inform policy on the consequent effects of similar minimum wage adjustments in urban and rural areas. The second simulation (difincr) is a rise in the wage rate for the formal rural labor by 10% compared to a 5% increase for the urban wage for the same labor category. The objective of this simulation is to observe where there is an impact of a higher rural wage increase unlike simulation 1. In the third scenario (difdecr), a 10% decrease in real wages in urban formal labor, and a 5% decrease in formal rural wages are implemented. These simulations have been applied to all economic activities, as they are all targeted by the minimum wage policy.

IV.   Results

The analysis is focused on output growth, labor market effects, and changes in incomes and expenditures; that is, changes in the consumption and sources of household income and other agents.

4.1 Impact on the labor market

In the first simulation, where we effect a 5% increase in minimum wages for formal workers in rural and urban areas, the demand for labor in most sectors decreases except for subsistence agriculture, other manufacturing, ICT and professional services where demand for labor slightly increases. The effect of a wage increase in urban areas has mixed effects on the demand for labor by industry.

Table 5.1: Changes in demand for composite (formal and informal) labor

Activity	Simincr		Difincr		Difdecr	
	Rural	Urban	Rural	Urban	Rural	Urban
Subsistence Agric-Crop	0.11	4.52	-0.31	2.10	-0.91	-12.67
Commercial Agric Crop	-1.62	5.13	-3.50	2.78	1.13	-13.64
Other agriculture	-0.94	1.76	-2.25	0.13	0.32	-6.55
Manufacturing -Food	-1.44	4.24	-2.65	1.69	1.45	-12.50
Manufacturing-cloth and textiles	-1.14	-1.16	-2.85	-1.19	0.43	1.62
Manufacturing -Other	0.23	2.06	0.27	0.08	-0.57	-7.61
Mining	-2.10	0.51	-4.32	-0.46	1.84	-3.28
Energy and water	-3.62	-0.82	-8.80	-0.48	1.76	1.68
Construction	-1.05	0.31	-2.10	-0.09	1.14	-2.21
Wholesale and Retail trade	-2.54	5.60	-1.70	2.41	6.60	-15.75
Accommodation and Food services	-1.97	0.43	-3.92	-0.45	1.97	-2.94
Transport	-3.65	-0.59	-7.92	0.53	2.99	1.64
ICT	0.97	-4.96	-1.70	-3.97	-5.36	12.23
Financial services	-1.43	-2.62	-6.91	-0.29	-3.59	8.52
Real estate	-2.14	-2.18	-4.74	-3.02	1.37	2.99
Professional and scientific	0.01	-3.19	-3.08	-2.87	-3.54	6.94
Personal and Domestic services	-3.39	3.08	-7.99	9.69	2.61	-1.10

Source: Authors calculation

Table 5.2: Changes in wages of composite (formal and informal) labor

Activity	Simincr		Difincr		Difdecr	
	Rural	Urban	Rural	Urban	Rural	Urban
Subsistence Agric-Crop	-0.43	-2.91	-0.4	-1.79	1.09	8.87
Commercial Agric Crop	0.7	-3.36	1.73	-2.17	-0.23	10.05
Other agriculture	0.37	-1.24	1.11	-0.34	0.15	4.52
Manufacturing -Food	0.12	-2.52	0.63	-1.45	0.45	7.84
Manufacturing-cloth and textiles	1.11	1.12	2.51	1.68	-0.7	-1.26
Manufacturing -Other	-0.57	-1.49	-0.66	-0.56	1.25	5.17
Mining	1.17	-0.19	2.63	0.56	-0.77	1.9
Energy and water	3.41	1.97	6.91	2.4	-3.28	-3.24
Construction	0.65	0.1	1.64	0.81	-0.17	1.2
Wholesale and Retail trade	-0.6	-3.27	-0.72	-2.09	1.28	9.81
Accommodation and Food services	1.06	-0.19	2.4	0.55	-0.64	1.92
Transport	2.53	1.36	5.22	1.89	-2.3	-1.83
ICT	1.24	3.32	2.75	3.57	-0.85	-6.33
Financial services	3.49	3.99	7.06	4.14	-3.36	-7.82
Real estate	1.4	1.43	3.07	1.94	-1.03	-1.98
Professional and scientific	1.32	2.46	2.9	2.83	-0.94	-4.38
Public services	-0.39	-0.39	-0.64	-0.64	0.5	0.5
Personal and Domestic services	2.31	1.2	4.81	1.75	-2.06	-1.45

Source: Authors calculation

The decrease in minimum wage, difdecr, for formal workers increases the demand for these workers across most sectors in urban and rural areas. The fall in minimum wage would in this case be a contributing factor to increase formality compared to a rise in wage. Conversely, demand for informal workers also reduces in most sectors.

Table 5.3: Demand for formal labor by sectors

Activity	SIMINCR		DIFINCR		DIFDECR	
	FR	FU	FR	FU	FR	FU
Subsistence Agric-Crop	-4.06	-1.83	-7.93	-3.21	4.13	1.70
Commercial Agric Crop	-4.85	-1.62	-9.34	-2.87	5.17	1.44
Other agriculture	-4.45	-3.11	-8.62	-3.97	4.64	5.33
Manufacturing -Food	-5.12	-1.78	-9.35	-3.34	6.07	1.13
Manufacturing-cloth and textiles	-4.08	-4.09	-8.18	-3.70	4.05	9.45
Manufacturing -Other	-4.04	-3.02	-7.58	-4.19	4.62	4.65
Mining	-4.96	-3.48	-9.48	-3.84	5.45	6.82
Energy and water	-4.79	-3.12	-10.86	-2.46	3.23	7.75
Construction	-4.34	-3.45	-8.10	-3.30	5.23	7.41
Wholesale and Retail trade	-6.72	-1.11	-9.44	-3.17	12.21	-1.22
Accommodation and Food	-4.93	-3.57	-9.26	-3.84	5.70	7.21
Transport	-5.47	-3.35	-11.13	-1.86	5.32	8.95

Activity						
ICT	-1.94	-6.18	-6.91	-5.02	-2.06	15.87
Financial services	-2.56	-3.37	-8.90	-0.94	-2.26	10.62
Real estate	-4.83	-4.85	-9.58	-5.28	4.75	10.27
Professional and scientific	-2.80	-5.06	-8.12	-4.48	-0.25	12.25
Public services	0.00	0.00	0.00	0.00	0.00	0.00
Personal and Domestic services	-5.37	0.09	-11.48	6.97	5.14	6.35

Note: FR represents formal rural and FU for formal urban labor
Source: Authors calculation

Table 5.4: Demand for informal labor by sectors

Activity	Simincr		Difincr		Difdecr	
	IR	IU	IR	IU	IR	IU
Subsistence Agric-Crop	0.82	5.39	1.02	2.82	-1.72	-14.35
Commercial Agric Crop	-0.02	5.62	-0.53	3.19	-0.74	-14.57
Other agriculture	0.41	4.02	0.26	2.02	-1.24	-11.29
Manufacturing -Food	-0.30	5.45	-0.54	2.69	0.11	-14.83
Manufacturing-cloth and textiles	0.80	2.97	0.75	2.31	-1.80	-7.83
Manufacturing -Other	0.83	4.12	1.40	1.79	-1.26	-11.86
Mining	-0.14	3.61	-0.68	2.15	-0.48	-10.04
Energy and water	0.05	4.00	-2.19	3.63	-2.57	-9.26
Construction	0.52	3.65	0.83	2.74	-0.68	-9.54
Wholesale and Retail trade	-1.98	6.16	-0.64	2.87	5.90	-16.81
Accommodation and Food	-0.10	3.52	-0.44	2.16	-0.24	-9.71
Transport	-0.67	3.75	-2.49	4.26	-0.60	-8.24
ICT	3.04	0.72	2.13	0.90	-7.57	-2.41
Financial services	2.38	3.74	-0.04	5.23	-7.75	-6.84
Real estate	0.00	2.15	-0.79	0.62	-1.14	-7.14
Professional and scientific	2.13	1.92	0.82	1.47	-5.86	-5.46
Public services	0.00	0.00	0.00	0.00	0.00	0.00
Personal and Domestic services	-0.56	7.45	-2.88	13.64	-0.76	-10.44

Note: IR represents informal rural and IU for informal urban labor
Source: Authors calculation

4.2 Migration

The migration of labor is affected differently in the three simulations. Increases in the minimum wage in Simincr and Difincr increase migration by 3.73% and 4.12%, respectively. The resulting comparatively higher increases in demand for labor in informal labor across sectors may be the pull factor for migrants towards urban areas. Most notably, the reduction in the minimum wage in simulation 3 leads to increased labor demand in formal

urban labor and a drop in the volume of the unemployed by as much as 57.7%, while also reducing the volume of migrants by 7%.

Table 5.5: Impact on volume of unemployment and migration

Simulation	Change in Volume of Unemployed (%)	Migration
Simincr	21.80	3.73
Difincr	14.21	4.12
Difdecr	-57.72	-7.04

Source: Authors calculaion

4.3 Impact on GDP growth

The impact of minimum wage changes on GDP are depicted in Table 5.6. Increases in the minimum wage (simincr and difincr) for formal urban and rural workers result in a reduction in real GDP levels by 0.198% and 0.495%, respectively. A higher increase of the formal rural minimum wage by 10% in Difincr, compared to 5% in Simincr, results in considerable higher reductions in aggregate output and GDP. However, a cut in the minimum wage has a positive impact on output and real GDP growth, which expand by 0.124% and 0.133%, respectively. Higher increases in minimum wage in rural areas has a negative effect on rural value added which contracts by -0.677 % compared to a 5% increase. Decreasing the minimum wage as applied in Difdecr has the effect of increasing the GVA of rural areas while contracting urban area GVA.

Table 5.6: Change (%) in value added, output and intermediate consumption

Indicator	Simincr	Difincr	Difdecr
Real GDP at market prices	-0.198	-0.405	0.133
Total industry output (XST)	-0.237	-0.517	0.124
Intermediate consumption (CI)	-0.259	-0.577	0.119
Rural gross value added	-0.311	-0.677	0.243
Urban gross value added	-0.018	-0.013	-0.117

Source: Authors calculation

The overall effect of increases in the wages of formal urban and formal rural workers leads to varied decreases in the value added of various industries. Results indicate that generally, most industry level growth in value added (see Table 5.7) contracts with increases

in minimum wage in rural areas when compared to urban areas, while it increases in more industries in urban areas. More notable impacts from a similar increase (Simincr) in the wage rate in the two regions is the growth in value added of manufacturing food in urban areas by 1.19% while in rural areas it contracts by 0.41%.

An increase in rural wage (Difincr) leads to negative growth in value added of most industries in rural areas and similarly in urban areas, as labor demand contracts from upward wage adjustments. However, there is notable growth in value added of personal and domestic services, and wholesale and retail trade activities in urban areas by 7.19%, and 1.17%, respectively. This is due to increased labor supply in urban areas from higher labor migration from rural to urban areas due to increased volume of unemployed in the rural areas. The increase is attributed to the high proportion of workers in the industries in the urban areas.

Table 5.7: Changes (%) in real value added by industry

Industry	Rural			Urban		
	Sim 1	Sim 2	Sim 3	Sim 1	Sim 2	Sim 3
Subsistence Agric-Crop	0.01	-0.04	-0.11	0.54	0.25	-1.60
Commercial Agric Crop	-0.11	-0.25	0.08	0.35	0.19	-1.00
Other agriculture	-0.09	-0.22	0.03	0.17	0.01	-0.65
Manufacturing -Food	-0.41	-0.76	0.41	1.19	0.48	-3.66
Manufacturing-cloth and textiles	0.32	-0.81	0.12	-0.33	-0.34	0.46
Manufacturing -Other	0.05	0.06	-0.13	0.46	0.02	-1.75
Mining	-0.48	-1.00	0.42	0.12	-0.11	-0.76
Energy and water	-0.96	-2.37	0.46	-0.22	-0.13	0.44
Construction	-0.41	-0.83	0.45	0.12	-0.04	-0.87
Wholesale and Retail trade	-1.25	-0.83	3.19	2.71	1.17	-7.93
Accommodation and Food	-0.45	-0.90	0.45	0.10	-0.10	-0.68
Transport	-1.67	-3.64	1.35	-0.27	0.24	0.74
ICT	0.48	-0.85	-2.69	-2.48	-1.98	5.95
Financial services	-0.57	-2.79	-1.44	-1.05	-0.12	3.34
Real estate	-0.18	-0.41	0.12	-0.18	-0.26	0.25
Professional and scientific	0.01	-1.50	-1.73	-1.55	-1.40	3.32
Public services	0.00	0.00	0.00	0.00	0.00	0.00
Personal and Domestic services	-2.54	-6.01	1.95	2.30	7.19	-0.82

Source: Authors calculation

4.4 Impact on international trade

The model approach is that of a small-country open economy, with the exchange rate as the numeraire, and a fixed current account balance. The effect of a change in the minimum wage on international trade are minimal as shown in Table 5.8. The impact of a rise in minimum wages increases the prices of domestically produced goods which results in increased demand for imports, which become relatively cheaper. The consequence is an exchange rate depreciation to counteract the effects of increased imports, and the effect on the balance in trade. The depreciation increases the prices of imports and, thereby, reduces the demand for imported goods. An increase in minimum wage increases the exports of all agricultural activities, other manufacturing and wholesale, and retail trade, which are labor intensive goods. However, a higher increase of minimum wage for the rural formal labor (Difincr) leads to a slight contraction in exports compared to a 5% increase (Simincr), as well as a higher contraction of total imports.

Table 5.8: Effect on international trade

Item	Exports			Imports		
	Simincr	Difincr	Difdecr	Simincr	Difincr	Difdecr
Total Exports/Imports	**0.000**	**-0.006**	**-0.002**	**-0.001**	**-0.002**	**0.000**
Subsistence Agriculture-Crop	0.003	0.004	-0.005	-0.007	-0.012	0.009
Commercial Agriculture Crop	0.003	0.003	-0.005	-0.004	-0.007	0.005
Other agriculture	0.001	0.001	-0.003	-0.004	-0.007	0.006
Manufacturing -Food	0.000	-0.002	-0.005	-0.003	-0.007	0.002
Manufacturing-cloth and textiles	-0.002	-0.006	0.001	-0.001	-0.002	0.002
Manufacturing -Other	0.003	0.002	-0.009	-0.003	-0.005	0.006
Mining	-0.002	-0.006	0.000	-0.001	-0.003	0.001
Energy and water	-0.012	-0.017	0.017	0.015	0.021	-0.025
Wholesale and Retail trade	0.005	0.002	-0.017	-0.009	-0.007	0.024
Transport	-0.003	-0.007	0.000	0.001	0.003	0.001
Accommodation and Food	-0.011	-0.019	0.011	0.009	0.016	-0.010
ICT	-0.014	-0.020	0.022	0.012	0.017	-0.022
Financial services	-0.027	-0.038	0.046	0.040	0.055	-0.066
Professional and scientific	-0.016	-0.023	0.026	0.016	0.021	-0.028
Personal and Domestic services	-0.018	-0.033	0.019	0.018	0.033	-0.018

Source: Authors calculation

4.5 Incomes and expenditure of agents

4.5.1 Government and firms

There is a negative effect on total government income from an increase in minimum wages in Simincr and Difincr (see Table 5.8), while a cut in minimum wages increases government income by 0.04 %. Similarly, an increase in minimum wages results in lower total business and household income taxes, and import duties, as well as product and import taxes. This is explained by growth in aggregate output and, hence, the policy simulation is not a major hindrance to growth. A decrease in minimum wage rises government income by 0.35%, mainly as a result of growth in revenue from import duties, business income taxes, product and import taxes, and indirect taxes on goods.

Table 5.8: Changes in income and savings of government

| Item	Simincr	Difincr	Difdecr
Government savings	-0.61	-1.29	0.35
Revenue source			
Business income taxes	-0.02	-0.03	0.05
Household income taxes	-0.04	-0.06	0.04
Indirect taxes on goods	-0.09	-0.22	0.01
Import duties	-0.20	-0.37	0.23
Production taxes	0.00	0.00	-0.01
Products and imports	-0.11	-0.24	0.05
Other production taxes	0.00	0.00	-0.01
Total government income	-0.07	-0.14	0.04
Government transfer income	0.10	0.22	-0.02

Source: Authors calculation

4.5.2 Households

Household incomes. Based on changes in factor prices change and the contribution of various sources to household income, changes in household income are expected. Figures 2, 3, and 4 show the percentage changes in total real household income and labor income for the 20 different households for the three simulations. There are mixed results from the simulations. Both Simincr and Difincr result in households in rural areas facing a reduction in labor and total incomes, while urban households increase their incomes. A higher increase in the rural formal minimum wage, Difincr, reduces rural household labor

and total incomes by more than 1% compared to a lower increase in the minimum wage in Simincr. The reduction in rural incomes resulting from a rise in rural minimum wages is explained by a decrease in labor demand in activities that are labor intensive and increased unemployment.

The total income of poorer households in rural areas, RHH1 to RHH5, experience reductions at a higher rate compared to richer households. Poorer households in rural areas are heavily dependent on paid employment as farm laborers, and are therefore disproportionately affected by wage increases. The rise in the minimum wage results in increased labor incomes of urban households. Notably, the rate of reduction in labor and total incomes of rural households is more than double the increase in the urban labor incomes. On the other hand, effects of a reduction in the minimum wage in urban and rural areas has a positive effect on rural households and a negative effect on urban households as depicted in Figure 4.

Figure 2: Impact of simulation 1 on household labor and total real income
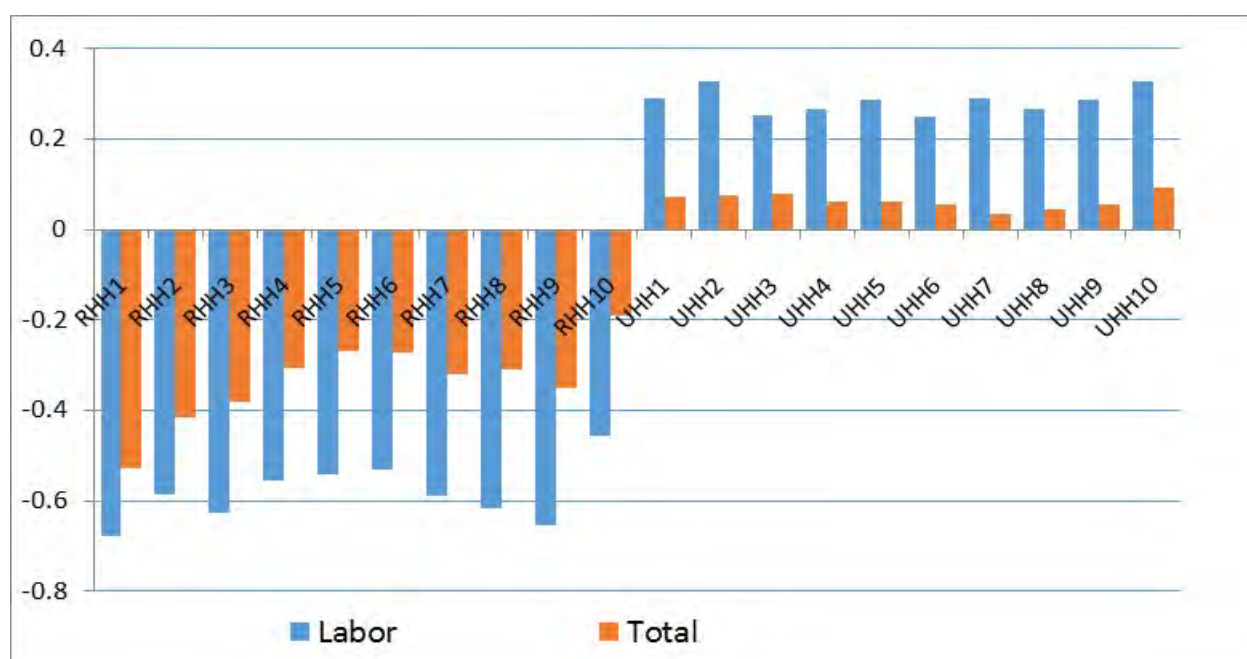
Source: Authors calculation

Figure 3: Impact of simulation 2 on household labor and total real income
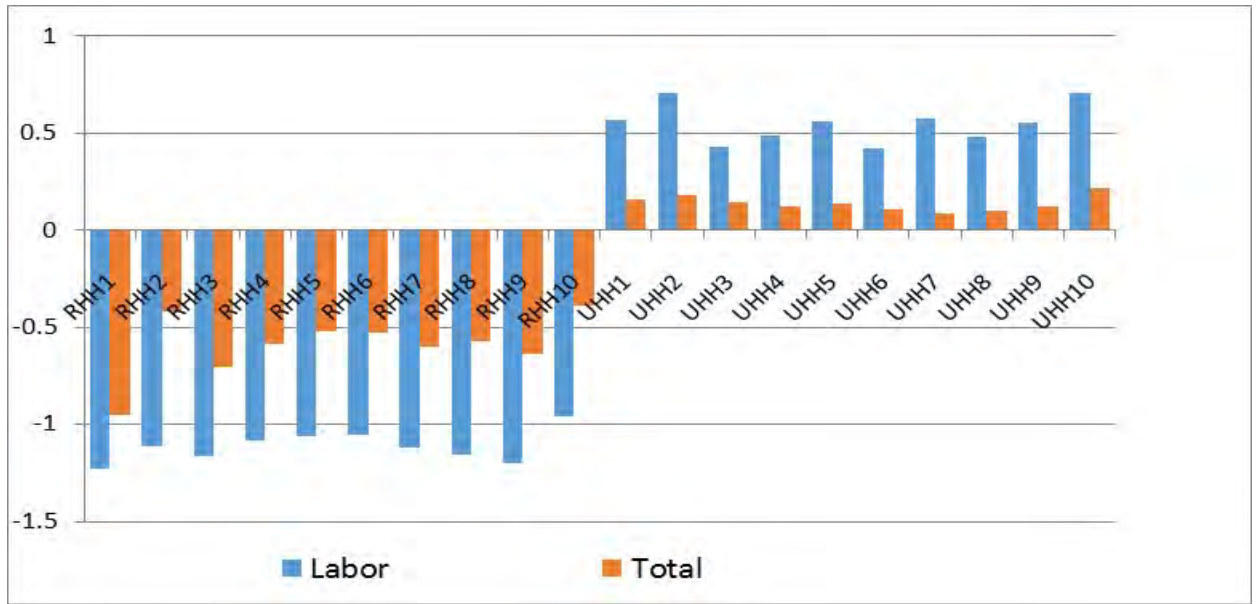
Source: Authors calculation

Figure 4: Impact of simulation 3 on household labor and total real income
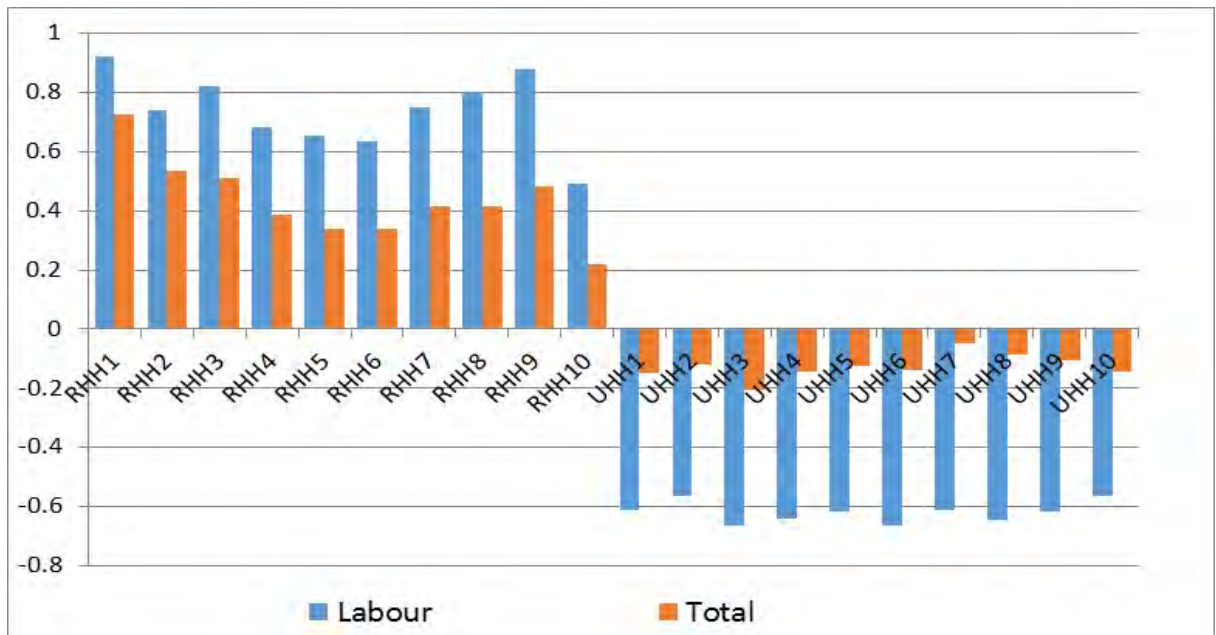
Source: Authors calculation

Household expenditures. The consumer price index (CPI) increases by 0.10% and 0.22% in Simincr and Difincr, respectively, and falls by 0.02% following Difdecr. The rise in the minimum wage and consequent rise in the CPI reduces the consumption budgets of both rural and urban households as depicted in Table 5.9. A cut in the minimum wage in urban and rural areas leads to a rise in the real consumption budget in rural households,

with the highest gain recorded for the poorest households, RHH1 and RHH2. However, Difdecr leads to a fall of urban household's real consumption budget.

Table 5.9: Changes (%) in real consumption budget of households

Household	Simincr	Difincr	Difdecr
RHH1	-0.623	-1.172	0.749
RHH2	-0.510	-1.006	0.558
RHH3	-0.475	-0.919	0.533
RHH4	-0.400	-0.803	0.412
RHH5	-0.365	-0.740	0.365
RHH6	-0.367	-0.748	0.364
RHH7	-0.414	-0.817	0.442
RHH8	-0.404	-0.788	0.440
RHH9	-0.447	-0.857	0.509
RHH10	-0.286	-0.608	0.246
UHH1	-0.022	-0.064	-0.124
UHH2	-0.020	-0.042	-0.094
UHH3	-0.017	-0.076	-0.179
UHH4	-0.034	-0.097	-0.119
UHH5	-0.033	-0.085	-0.100
UHH6	-0.039	-0.113	-0.115
UHH7	-0.061	-0.134	-0.025
UHH8	-0.049	-0.121	-0.063
UHH9	-0.040	-0.098	-0.082
UHH10	-0.002	-0.004	-0.121

Source: Authors' calculation

V.   Conclusions and policy implications

The study has assessed the implications of minimum wage on the Kenyan labor market, the economy and poverty with the use of a CGE model. From the analysis it can be concluded that minimum wage policy has multiple impacts on growth, the labor market, and households. The simulations show that a rise in minimum wages in urban and rural areas has differential impacts for rural and urban areas. Furthermore, the results reveal that increases in wages lead to an increase in the price level, thereby indicating that the policy contributes to inducing inflation in the economy. The minimum wage policy, despite unemployment, and high informality is therefore a critical policy for the country.

The overall effect of varied increases in the wages of formal urban and formal rural workers leads to varied increases in the value added of various industries, with an overall negative effect on real GDP growth. Conversely, a cut in the minimum wage increases the level of real GDP, with minimal overall effects on international trade. The cut in wages in both rural and urban areas has a positive effect on the labor market, reducing unemployment, with an increase in labor employed in the formal sector, higher revenue for the government and higher incomes for the poorest households, which are located in the rural areas. In conclusion, minimum wages often have a negative effect on poorer households in rural areas while having a benefit for urban areas. Therefore, the application of high minimum wages should be implemented with caution, and balance the demands for higher wages, and effects on economic and income distribution issues given the labor market situations and outcomes.

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Appendices

Appendix 1: Household consumption of products

Rural households

Commodity	RHH1	RHH2	RHH3	RHH4	RHH5	RHH6	RHH7	RHH8	RHH9	RHH10
Sub Agric-Crop	29.5	24.7	23.3	23.9	22.2	21.0	18.2	15.4	13.3	6.4
Com Agric Crop	10.4	11.0	10.0	11.7	9.2	9.7	7.8	7.0	5.8	3.3
Other agriculture	2.3	8.9	5.9	8.6	10.3	7.0	6.2	9.4	6.9	4.3
Mining	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Manu-Food	21.4	26.3	27.1	17.9	23.1	25.3	25.7	25.8	26.1	9.9
Manu-cloth and textiles	2.4	2.8	3.1	3.5	3.9	4.1	4.8	5.5	4.7	3.5
Manu-Other	2.9	2.8	2.5	3.3	5.8	2.2	3.5	3.1	3.5	14.3
Energy and water	1.2	1.1	1.1	1.0	0.9	1.0	1.0	1.1	0.8	0.6
Construction	0.2	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.1	0.1
Wholesale and Retail trade	1.2	1.3	1.5	2.4	1.1	2.5	4.1	3.0	3.3	15.7
Transport	15.6	6.7	13.1	13.1	10.6	10.8	8.8	8.9	8.0	4.8
Accommodation	0.2	0.2	0.2	0.5	0.3	0.6	0.4	0.7	0.8	0.7
ICT	0.5	0.9	1.0	1.6	1.2	1.8	2.4	3.1	3.1	3.4
Financial services	0.3	0.1	0.2	1.9	0.3	0.4	0.2	0.8	1.5	2.3
Real estate	2.9	0.7	1.3	2.1	1.3	3.4	6.4	4.0	9.8	17.8
Professional and scientific	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Public services	6.8	7.3	6.7	7.5	8.4	8.4	9.0	11.1	10.7	10.5
Personal and Domestic services	2.4	5.1	3.1	0.9	1.3	1.5	1.4	1.0	1.5	2.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Urban households

Commodity	UHH1	UHH2	UHH3	UHH4	UHH5	UHH6	UHH7	UHH8	UHH9	UHH10
Sub Agric-Crop	0.0	1.5	0.6	1.4	1.3	6.0	7.6	13.1	8.8	6.8
Com Agric Crop	0.0	1.2	1.3	0.4	1.0	2.8	4.5	5.8	4.9	2.9
Other agriculture	0.0	2.7	0.9	0.7	6.9	4.8	3.1	5.4	7.3	3.3
Mining	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0
Manu-Food	33.8	48.0	46.5	35.0	39.0	25.5	20.7	15.7	21.9	11.8
Manu-cloth and textiles	0.7	1.5	1.9	1.8	2.3	2.1	1.7	1.6	3.1	3.8
Manu-Other	0.7	2.2	1.5	1.1	1.2	2.0	1.0	1.3	1.9	11.7
Energy and water	2.1	4.1	3.7	2.9	3.3	2.5	1.9	2.0	2.5	2.7
Construction	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Wholesale and Retail trade	0.0	0.0	0.0	0.0	0.3	0.1	0.4	12.9	1.8	13.8
Transport	50.9	29.3	33.5	20.5	27.3	39.5	46.4	23.9	18.3	3.4
Accommodation	0.0	0.0	0.1	0.1	0.5	0.1	0.2	0.5	1.0	1.8
ICT	0.5	0.4	0.7	0.8	1.2	1.6	1.6	2.2	4.2	6.7
Financial services	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.1	2.9	5.9
Real estate	0.0	0.9	1.5	0.5	1.4	7.0	7.4	8.5	11.6	12.8
Professional and scientific	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.3
Public services	4.5	4.5	3.4	3.9	4.2	4.0	3.3	3.7	6.8	10.7
Personal and Domestic services	6.7	3.9	4.4	30.7	9.8	2.1	0.1	3.3	2.9	1.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Appendix 2: Distribution of household expenditure

Household	Consumption	Taxes	Savings	ROW
Total RHH	**49.12**	**34.16**	**28.07**	**-**
RHH1	1.23	0.10	(2.88)	-
RHH2	1.98	0.27	(2.01)	-
RHH3	2.77	1.23	(1.22)	-
RHH4	3.26	1.26	0.39	-
RHH5	4.04	1.68	0.37	-
RHH6	4.52	3.61	5.33	-
RHH7	5.52	3.91	5.71	-
RHH8	6.25	5.50	10.65	-
RHH9	7.93	6.14	14.34	-
RHH10	11.63	10.47	(2.61)	-
Total UHH	**50.88**	**65.84**	**71.93**	**100.00**
UHH1	0.17	0.05	0.00	-
UHH2	0.30	0.08	0.01	-
UHH3	0.45	0.02	0.02	-
UHH4	0.76	1.55	0.04	-
UHH5	0.96	1.78	0.10	3.48
UHH6	1.81	0.83	1.32	2.40
UHH7	3.79	2.22	2.81	3.89
UHH8	5.28	4.00	7.00	11.50
UHH9	6.83	15.05	23.13	16.87
UHH10	30.53	40.25	37.50	61.86