Gender Labor Income Shares and Human Capital Investment in the Republic of Congo

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Chapter 10

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Introduction

Despite general consensus on the existence of gender disparities in African labor markets, assessing their nature, extent, and implications remains a challenge. Databases provide incomplete and limited information on the relative situations of men and women. And empirical studies use diverse methodologies and definitions of employment and earnings, which makes comparability difficult, and focus mostly on urban areas (see, for instance, Appleton, Hoddinott, and Krishnan 1999; Brilleau, Roubaud, and Torelli 2004). Drawing on a meta-analysis of studies on the gender pay gap, Weichselbaumer, Winter-Ebmer, and Zweimüller (2007) find that only a small minority of empirical studies conducted on the topic since the 1960s draw on African data.

In West and Central Africa, most of the household surveys available do not record labor incomes, or do so very imperfectly, in large part because most workers are involved in informal sector activities that often are not compensated through wages. However, the Republic of Congo is an exception: it is a fairly rich economy by African standards, in large part resulting from oil resources. Some 80 percent of the population lives in urban areas, especially in two major cities—the capital Brazzaville and Pointe Noire, where most of the oil-related activity is concentrated.

The conceptual framework and empirical methodology used in the section, "Impact of Gender Labor Income Shares on Consumption," of this chapter follow closely a similar paper on Senegal by Bussolo, De Hoyos, and Wodon (2009). The authors gratefully acknowledge comments from Jorge Arbache and Mayra Buvinic. The views expressed in the chapter are those of the authors and need not reflect those of the World Bank, its executive directors, or the countries they represent.

As a result of a high level of urbanization and a substantial share of the workforce involved in wage labor, it is feasible not only to compare the earnings of men and women, but also to assess how they affect consumption choices. Thus, the focus on the effect of labor incomes on consumption choices in this paper stems from recognition in the literature that higher labor incomes for women can have significant beneficial impacts for poverty reduction and human development.

As noted, among others, in Bussolo, De Hoyos, and Wodon (2009), whose analysis and framework this study follows closely, at least three different aspects of poverty can be related to the decisions made by various household members in terms of their allocation of time and their prospects for labor income. First, traditional consumption-based poverty is directly related to the earnings of household members, as well as to household size. Both factors depend in part on who is working in the household and how much various household members earn.

Second, the issue of relative power within the household (whether the household head or the spouse makes key decisions, either separately or jointly) also depends on the earnings of various household members. The unitary model of the household—which assumes that the household acts as if it were a single utility-maximizing individual with defined preferences and a budget constraint—has long been challenged by economists. Instead, what has emerged from the literature of the past 20 years is a bargaining model that assumes that household members differ in their preferences and engage in a negotiation process to maximize their personal utility (see, among others, Bourguignon and Chiappori 1992; Hoddinott and Haddad 1995; Browning and Chiappori 1998; Bussolo, De Hoyos, and Wodon 2009). This bargaining model implies that the income share controlled by women may have important long-term effects on investments in the human capital of children. The empirical evidence to date does indeed suggest that, when women are less engaged in income-generating activities, they have less influence on household decision making and on how the household invests in the human capital of children, which may reduce the likelihood that their children will avoid poverty in the future.

Third, time poverty—that is, working more hours than is desirable without much choice not to because of financial poverty—is an important welfare measure in its own right. It is the direct result of the decisions made within the household regarding the allocation of both domestic and productive work. For example, women tend to work much less in the labor market, but this is more than compensated for by long hours spent on domestic work, so that they tend to be more time-poor than men (that is, a larger share of women than men work long hours) (Blackden and Wodon 2006).

This study focuses on the second of the above three aspects related to the importance of the role of women in labor markets. It uses a recent, nationally representative household survey for the Republic of Congo—the 2005 ECOM

(Enquête Congolaise auprès des Ménages 2005) survey—to test the unitary model of household consumption. Congo is a good country for such an analysis because the correlation in the survey data between consumption and income is especially good in Congo. That is, income sources are not substantially underestimated in Congo as is often the case in other African countries.[1] This accuracy enables a proper analysis of the links between income data and consumption patterns. As in much of the rest of the literature, this study finds that a higher labor income share obtained by women does indeed lead to a higher share of household consumption allocated to investments in human capital (as proxied through spending for food, education, health, and children's clothing). The impact is not negligible and it is statistically significant, suggesting long-term benefits through children from efforts to increase female labor income.

This chapter is structured as follows. First, basic data is provided on income sources in Congo, as well as a brief analysis of the characteristics and correlates of wage income. This is followed by a description of the study's conceptual framework and empirical methodology to test the unitary model of the household. Next, empirical results are presented, followed by conclusions.

Income Sources in the Republic of Congo

Basic data on income sources in Congo, as well as an assessment of the characteristics and correlates of wage income as measured at the individual level are provided in this section. Since other income sources are measured at the household level, they cannot be disaggregated by gender. Given that wages represent a large share of total income in Congo, the problem of not being able to identify other income sources by gender is likely not to be too serious for the analysis that follows.

Data

Providing a context for the rest of the chapter, this section gives simple summary statistics on the various income sources obtained by households in Congo using the 2005 nationally representative ECOM survey. Aggregate income is calculated using two sources of data: the section of the survey questionnaire about income and revenue and the section about (cash) transfers received from other households. Income includes wages, profits from agricultural activities (including auto-consumption), profits from non-agricultural activities, public transfers (work pension, grants), private transfers, property revenue, exceptional revenue, and fictitious income (rent attributed to home-owning households and value of use of durable goods). The rent attributed to home-owning households and the use value for durable goods are considered as both consumption and revenue items. Where appropriate (in particular for wages), the aggregate

household income was calculated at the individual level before consolidating individual data at the household level.

The analysis is conducted on 4,774 households that declared a monetary income (excluding fictitious income). The 228 households (4.6 percent of the sample) with zero income were excluded from the analysis (these excluded households appear to be distributed relatively evenly across quintiles of living standards, thereby reducing the risk of selection bias due to non-response). We observe a rather good correlation between total household income and household consumption, as suggested in table 10.1. Household income per capita increases with the standard of living quintiles, and the average annual household income amounts to CFAF 1.753 million (Congolese francs), while consumption totals 1.516 million CFAF, that is, a ratio of 1.16.

Share of Households Receiving Various Income Sources

Table 10.2 provides data on sources of income in Congo. The analysis first considers how common income sources are in terms of the share of households receiving income from each source (beneficiary incidence). With the exception of fictitious income, the most common type of household income comes from non-agricultural enterprises, while the least common is income from property and public transfers. For almost 6 households in 10, a non-agricultural enterprise can be observed, more so in rural areas (7 in 10) than in urban areas (almost half). These enterprises are, for the most part, to be found in the informal sector and have few or no barriers to entry (low capital, absence of legislation, and so on), thus explaining the extent of the phenomenon. All types of households are concerned, both poor and non-poor, although in cities, this type of activity is relatively less common among households in the richest quintile of per capita consumption. After income from non-agricultural enterprises, private

Table 10.1 Household Income and Consumption by Quintile of Consumption in the Republic of Congo, 2005

	Urban		Rural		National	
	Income (CFAF 1,000)	Consumption (CFAF 1,000)	Income (CFAF 1,000)	Consumption (CFAF 1,000)	Income (CFAF 1,000)	Consumption (CFAF 1,000)
Poorest quintile	1,022.6	657.4	617.0	452.3	774.2	531.7
Second quintile	1,269.8	933.5	823.8	686.3	1,027.7	799.3
Third quintile	1,775.4	1,300.8	1,012.4	1,005.5	1,442.2	1,171.9
Fourth quintile	2,114.8	1,739.8	1,088.3	1,330.1	1,795.3	1,612.3
Richest quintile	4,282.0	3,800.1	1,763.5	2,246.6	3,708.2	3,446.2
Total	2,352.9	1,937.7	944.1	948.0	1,753.0	1,516.3

Source: Authors' calculations based on 2005 ECOM household survey. For more information on the ECOM survey, see Centre national de la statistique et des études économiques 2004.

Table 10.2 Household Income in the Republic of Congo According to Sources, 2005

		% households with this income			% household income			Share of households in income		
		Urban	Rural	Congo, Rep. of	Urban	Rural	Congo, Rep. of	Urban	Rural	Congo, Rep. of
Wages	Poorest	24.3	9.0	17.3	22.7	3.7	16.2	3.2	2.2	3.1
	Q2	35.2	6.2	22.3	33.3	8.3	27.2	8.3	5.4	8.0
	Q3	41.1	12.6	28.8	39.0	32.8	37.1	11.2	32.8	13.6
	Q4	47.8	11.8	31.9	53.0	12.2	42.9	24.0	14.5	22.9
	Richest	56.0	18.7	39.6	51.0	21.2	45.0	53.3	45.1	52.4
	Total	43.0	12.4	29.5	45.9	18.0	39.2	100.0	100.0	100.0
Income from agricultural enterprise	Poorest	24.1	95.2	56.6	8.7	51.3	23.3	23.9	18.9	19.9
	Q2	18.6	92.1	51.2	4.4	36.0	12.1	21.6	14.3	15.8
	Q3	14.6	86.2	45.5	3.0	29.1	10.9	16.5	17.9	17.6
	Q4	13.1	86.5	45.5	1.8	34.3	9.8	16.1	25.1	23.3
	Richest	6.9	71.5	35.4	1.1	18.2	4.5	21.9	23.8	23.4
	Total	14.3	84.8	45.5	2.4	29.3	8.8	100.0	100.0	100.0
Income from non-agricultural enterprise	Poorest	56.3	65.7	60.6	26.2	21.5	24.6	9.0	8.6	8.9
	Q2	54.3	71.7	62.0	27.2	27.0	27.1	16.5	11.7	15.0
	Q3	51.0	70.4	59.3	20.9	20.1	20.7	14.6	13.4	14.2
	Q4	45.5	75.2	58.6	15.3	25.4	17.8	16.8	20.2	17.9
	Richest	39.7	67.1	51.8	17.0	32.4	20.1	43.1	46.1	44.0
	Total	48.1	70.0	57.8	18.9	26.9	20.8	100.0	100.0	100.0
Public transfers	Poorest	11.5	1.4	6.9	9.8	1.8	7.0	9.0	10.2	9.1
	Q2	10.8	4.1	7.8	8.3	2.8	7.0	13.4	17.6	13.8
	Q3	11.8	2.6	7.8	5.3	0.8	3.9	9.9	7.8	9.7

continued

Table 10.2 Household Income in the Republic of Congo According to Sources, 2005 *continued*

		% households with this income			% household income			Share of households in income		
		Urban	Rural	Congo, Rep. of	Urban	Rural	Congo, Rep. of	Urban	Rural	Congo, Rep. of
	Q4	10.8	3.4	7.6	5.5	1.3	4.5	16.1	14.8	16.0
	Richest	8.2	5.6	7.0	7.6	2.4	6.6	51.6	49.7	51.5
	Total	10.4	3.6	7.4	7.1	1.9	5.8	100.0	100.0	100.0
Private transfers	Poorest	42.4	36.3	39.6	8.6	4.6	7.2	7.6	8.2	7.7
	Q2	46.3	39.9	43.5	6.8	6.5	6.7	10.6	12.5	11.0
	Q3	50.8	49.2	50.1	9.8	3.6	7.9	17.5	10.7	16.1
	Q4	54.0	52.9	53.5	8.0	9.8	8.4	22.5	34.5	25.0
	Richest	53.2	51.3	52.3	6.4	5.4	6.2	41.7	34.2	40.2
	Total	50.1	46.8	48.7	7.3	6.1	7.0	100.0	100.0	100.0
Revenue from property	Poorest	3.6	0.5	2.2	1.0	0.1	0.7	3.2	3.3	3.2
	Q2	7.8	0.4	4.5	1.8	0.1	1.4	9.8	4.3	9.6
	Q3	7.5	0.4	4.4	2.8	0.2	2.0	17.6	16.4	17.6
	Q4	5.8	0.4	3.4	1.4	0.4	1.2	14.0	52.3	15.0
	Richest	7.3	0.6	4.4	2.4	0.1	2.0	55.4	23.8	54.6
	Total	6.5	0.5	3.9	2.1	0.2	1.6	100.0	100.0	100.0

Other monetary revenue	Poorest	12.4	6.4	9.7	4.2	1.6	3.3	8.4	19.7	9.3
	Q2	12.7	5.6	9.5	4.2	1.1	3.4	14.6	14.6	14.6
	Q3	11.3	6.7	9.3	4.1	0.5	3.0	16.4	10.3	15.9
	Q4	8.6	3.2	6.2	3.0	0.5	2.4	18.8	11.7	18.2
	Richest	11.1	4.1	8.0	2.8	1.0	2.5	41.8	43.6	41.9
	Total	11.1	5.0	8.4	3.3	0.9	2.7	100.0	100.0	100.0
Fictitious income	Poorest	99.3	99.1	99.2	18.8	15.6	17.7	6.5	10.8	7.5
	Q2	99.4	99.7	99.5	14.1	18.3	15.1	11.5	11.6	11.5
	Q3	99.2	99.7	99.4	15.2	12.8	14.5	13.2	18.0	14.3
	Q4	99.7	99.9	99.8	12.1	16.1	13.1	20.8	21.4	20.9
	Richest	99.4	99.9	99.6	11.7	19.2	13.2	48.0	38.2	45.7
	Total	99.4	99.7	99.5	13.0	16.9	13.9	100.0	100.0	100.0

Source: Authors' calculations based on 2005 ECOM household survey.

transfers (for example, from other households) are the second most common source of income. Like income from non-agricultural enterprises, transfers are enjoyed by all categories of households.

The level of private transfers, at least in terms of the extent of the phenomenon, suggests a relatively high degree of solidarity in Congolese society. Almost half of all households benefit from a transfer from another household (in Congo or abroad), although this is not necessarily the case for poor households. By contrast, public transfers benefit only 7 percent of households. The beneficiary incidence is slightly pro-poor in urban areas (almost 11.5 percent of households in the first quintile are beneficiaries compared to 8.2 percent in the richest quintile), but poorly targeted in the rest of the country. In terms of benefit incidence, however, which takes into account the amounts received apart from who receives transfers, public transfers are clearly benefiting better-off households most.

Income from property and exceptional gains is the least common form of income. Income from property (received by less than 4 percent of households) can be observed in urban areas, mostly among more affluent households. This income may require an investment (real estate income, for example), and this investment is more often accessible by more affluent households. Finally, agricultural income is the third most common source of household income; yet, a large proportion of agricultural households do not receive monetary income from this activity and practice subsistence agriculture. Monetary agricultural income is observed for only one-third of households, while less than one-third earn wages from this activity. Monetary agricultural income is less common in the richest quintile than in the other quintiles. By contrast, wages are more likely to be received among better-off households.

Share of Various Income Sources in Total Household Income

What matters more for this analysis is the share of various income sources in total income. Wages represent the main source of household income, followed by non-agricultural enterprises; these two sources alone account for more than 60 percent of total income; however, the proportion of cash income represented by both sources is higher, since total income also includes fictitious income, such as the rental value of owner occupied dwellings, the use value of durable consumption goods, as well as auto-consumption.

Wages account for 39.2 percent of all income—the share of wages is higher in urban areas, where they account for 45.9 percent of income—and this is also the income source most positively correlated with standard of living. To illustrate this, wages account for almost 16.2 percent of income in the poorest quintile, 27 percent in the next quintile, and 45 percent of the richest quintile. Non-agricultural enterprises are the main source of income for households in the first quintile (representing a quarter of all income), slightly ahead of

agricultural income, and well ahead of wages. If, however, auto-consumption is omitted from agricultural income, this source would fall behind wages for this category of households (the poorest quintile). Although more than two households in five practice an agricultural activity, agricultural income is relatively low, thereby explaining poverty among the rural population. Generally speaking, the small size of the areas farmed, low capital (implying low rates of mechanisation in agriculture), and insufficient use of inputs result in low output in the agricultural sector, which is more characteristic of subsistence agriculture, as illustrated by the high proportion of auto-consumption in agricultural income (almost half of agricultural income is in fact auto-consumption).

Public and private transfers represent close to 13 percent of household income, which is a relatively large proportion. This figure is higher in towns, where transfers account for almost 14 percent of total household income, compared to only 8 percent in rural areas. Examining the relative share of the different income sources in total household income highlights the importance of income from activity and shows that the labor force, the soil, and solidarity are the main factors of production of the population. Indeed, income from property, which is primarily income from capital, accounts for less than 2 percent of household income (although it must be noted that capital income may not be measured accurately).

The two most common types of household income are among those for which inequalities are most pronounced. With regard to wages, the poorest 40 percent of households account for only 11 percent of income from wages, whereas the richest quintile alone accounts for more than half of this source of income. Earning a wage is, to some extent, a privilege. It can be shown that a proportional increase in wages would benefit mostly the non-poor and would increase inequality (this can be demonstrated using a source decomposition of the Gini index of inequality), even if a proportion of the wages is redistributed among the households in the form of private transfers. Income from non-agricultural enterprises is also highly unequal. If it is hypothesized that in order to obtain a large income from this type of activity, a certain amount of capital is required—which, because of imperfections in the credit market, is more accessible to people who are already non-poor by means of auto-financing—one element therefore explains the other.

At the other extreme, agricultural income (including auto-consumption) is less unequal. The poorest 20 percent of the population account for 19.9 percent of agricultural income, and the richest 20 percent for 23.4 percent. Although a large number of poor people earn their living from agriculture, the non-poor nevertheless account for relatively more of this type of income. The explanation is the same as before: the non-poor have better quality means of production and they demonstrate higher productivity and higher income. Unsurprisingly, income from property is firmly in the hands of the richest households; the

households in the highest quintile account for almost 60 percent of this category of income and the poorest quintile, only 3.3 percent.

Characteristics and Correlates of Wage Income

Wage-paying jobs are less likely among women, who also have a lower average level of education than men. Less well-educated people often have no choice but to resort to agriculture or self-employed non-agricultural activities, and the low returns from these jobs often force them into poverty. The public sector accounts for 46 percent of wage employment, while private firms account for 34 percent; large companies provide only 12 percent of wage-paying jobs. The importance of the public sector for wage work is also reflected in the employment structure of each economic sector. The services (administration, education/healthcare, and other services) account for more than 60 percent of wage-paying jobs. By contrast, trade and agriculture provide few wage-paying jobs (9 percent and 4 percent, respectively), and jobs in industry are rare (less than 9 percent).

As mentioned, analyzing the distribution of wages highlights substantial inequalities. The average wage is CFAF 149,000 per month (about US$300), but half of all wage-earners earn less than CFAF 80,000 per month. As expected, wages are affected by age (which is a proxy for professional experience) and education level. Taking the average wage of individuals under age 30 as a reference, the wages of people aged 30–39 are more than one-third higher and those of individuals 40-49 are almost twice as high. Similarly, wages increase significantly with level of education.

To confirm these results, we performed a standard regression analysis. The dependent variable is the logarithm of the hourly wage. The independent variables are education, professional experience (measured by the estimated number of years of professional experience), and other variables (gender, nationality, residence, institutional sector, and branch of activity).

The results (table 10.3) suggest good returns on education and professional experience, as well as a higher level of wages in the public sector than in other sectors. Individuals with lower secondary, higher secondary, and tertiary education earn wages approximately 40 percent, 74 percent, and 157 percent higher, respectively, than individuals with no formal education. However, there is no statistically significant difference in wages between a person who abandoned studies at the primary level and someone who never went to school.

With regard to professional experience, an extra year of work increases wages by about 2 percent, which results in relatively high wages for individuals over age 50. Compared to those working in private micro-enterprises, an individual with the same characteristics working in the public sector earns on average 83 percent more, whereas a person working in a large private company earns 66 percent more. Finally, with regard to the sector of activity, it is more advantageous to work outside the agricultural sector, in particular in mining (133 percent

Table 10.3 Determinants and Basic Statistics Concerning Individuals' Wages in the Republic of Congo, 2005

		Regression		Monthly wage and structure		
Variable	**Details**	**Estimated parameter**	**Student T**	**Average wage**	**Median wage**	**Employee structure**
Education	None	ref	ref	62,819	40,000	4.5
	Primary	0.0221	0.13	63,794	40,000	9.3
	Secondary 1	0.3342**	2.22	105,277	61,000	28.4
	Secondary 2	0.5560***	3.65	129,285	80,000	31.3
	Higher	0.9473***	6.02	263,879	113,000	26.5
Experience	Experience	0.0231***	2.69	—	—	—
	Experience squared	−0.0001	−0.62	—	—	—
Age	Under 30	—	—	91,719	46,000	17.6
	30 to 39	—	—	122,574	70,000	30.4
	40 to 49	—	—	166,962	98,446	32.2
	50 to 59	—	—	228,958	108,000	16.9
	60 and over	—	—	110,751	60,000	3.0
Gender	Male	ref	ref	158,207	83,000	74.8
	Female	−0.2296***	−3.38	121,867	60,000	25.3
Nationality	Non-Congolese	ref	ref	142,688	80,000	5.2
	Congolese	−0.1413	−0.88	149,376	79,000	94.8
Residence	Rural	ref	ref	91,222	60,000	18.2
	Urban	0.3196***	4.48	161,870	80,000	81.8
Institution	Public	0.6074***	6.38	190,581	100,000	46.3
	Large private firm	0.5085***	4.83	189,682	90,000	12.2
	Private micro-enterprise	ref	ref	125,104	65,000	22.0
	Associative firm	0.2435	1.40	72,382	60,000	3.8
	Home help	−0.3685***	−3.45	56,923	31,000	15.7
Branch	Agriculture	ref	ref	103,120	10,000	3.9
	Mining	0.8476***	2.78	235,115	122,000	1.3
	Industry	0.4300***	2.71	179,696	70,000	8.8
	Public works	0.3945**	2.00	145,085	75,000	5.0
	Transport	0.6958***	4.14	168,937	80,000	8.7
	Trade	0.6028***	3.81	79,573	60,000	9.3
	Services	0.4776***	3.14	119,758	65,000	18.3
	Education/healthcare	0.4458***	2.73	150,084	88,000	16.6
	Administration	0.3437**	2.14	186,468	90,000	26.5
	Other	0.3130	1.24	132,549	50,000	1.6
Constant	Constant	4.4477***	18.23	149,031.4	80,000	100
Statistics	Observations	1,610				
	R^2	0.2881				
	Dependent variable	Logarithm of hourly wage				

Source: Authors' calculations based on 2005 ECOM household survey.
Note: **Significant at the 5% level. ***Significant at the 1% level.

gain versus agriculture), transport (101 percent), and trade (83 percent). The results also show a gap between men and women, with men receiving wages 21 percent higher than women, even after controlling for all the other potential determinants of wages discussed here.

Impact of Gender Labor Income Shares on Consumption

A detailed framework for the empirical work conducted in this study is provided in Bussolo, De Hoyos, and Wodon (2009). Here, we outline only the main points. Following Hoddinott and Haddad (1995), we use a simple model and estimation procedure to test whether a higher labor income share for women within a household influences the spending decisions of the household. The empirics rely on an expanded version of the Working-Leser expenditure system. In this econometric model, the budget share allocated to expenditure category j is a function of the log of household size, the log of per capita expenditure, the share of total income controlled by women (Y_F/Y), demographic variables, regional variables, and other controls:

$$S_j = \alpha + \beta_{j,1}\ln(H) + \beta_{j,2}\ln(E) + \beta_{j,3}\left(\frac{Y_F}{Y}\right) + \sum_{l=1}^{L}\gamma_{j,l}\left(\frac{K_l}{H}\right) + \delta_j X + \varepsilon \qquad (10.1)$$

where H is household size; E is per capita household expenditure; K_l is the number of household members within demographic category l; $\mathbf{X}$ is a vector with regional location variables and other controls; α, β, γ and δ are parameters to be estimated; and ε is a random component assumed to be normally distributed. Note that this specification implies that the sum of all parameters estimates for any regressor is equal to 1. This feature of the model is known as the "adding up restriction" (see Deaton and Muellbauer, 1980). The key variable is Y_F/Y, which captures the bargaining power of women within the household. We would expect that if women have a stronger preference for expenditure categories that directly benefit their children (such as education or health), an increase in that variable would cause an increase in the expenditure shares allocated to these categories. We expect that $\beta_{j,3}$ will be positive, which would reject the income-pooling hypothesis in favor of a more complex, intra-household bargaining process. Bussolo, De Hoyos, and Wodon (2009) provide a more thorough discussion of the implications of different values obtained in the estimation for assessing the impact of an increase in female labor income, not only on the share of spending allocated to various goods, but also the level of spending.

Following Bussolo, De Hoyos, and Wodon (2009), we consider several different types of expenditure categories, four of which are expected to have an especially positive effect on human capital formation and, more generally, the well-being of children: food, health, education, and children's clothing. The other seven expenditure categories are adults' clothing, alcohol, tobacco, housing, transportation, entertainment, and other expenditures. The shares of household members in different age and gender categories as a proportion of total household size are used as demographic controls. In particular, we use gender and age to form eight demographic categories: boys and girls below

6 years of age, boys and girls between 6 and 14, women and men between 15 and 59, and women and men 60 years old or more. Other controls include a dummy variable for each of the two main cities in Congo, as well as for other urban and rural areas (Brazzaville, the capital, is the reference category, with Pointe Noire being the other large city), and a dummy variable for female-headed households. The ratio Y_F/Y is formed by dividing female wage income for the spouse (or the household head when the household head is female) by the sum of the spouse's wage and that of the household head.

The average household in Congo has fewer than five members, each consuming slightly less than CFAF 300,000 a year (about US$600). In 2005, 13 percent of households were headed by women, and 14 percent were located in rural areas. The women's bargaining proxy Y_F/Y shows that female spouses contributed only 17 percent of total household wage income brought by either the household head or the spouse.

Before presenting the results of the regressions, it is useful to provide some basic statistics on the shares of total consumption allocated to various goods. According to the 2005 ECOM, the average household spends 39 percent of its total budget on food and more than a fifth (22 percent) on housing (this includes the imputed rental value of the dwelling when the household owns the dwelling). Health accounts for 4.5 percent of the total household budget; only 1.7 percent is allocated to education. Clothing for children receives on average 1 percent of the total household budget, well below clothing for adults, at 4.5 percent. Tobacco accounts for only a very small share of total consumption (0.2 percent), while alcohol is more significant, at 1.7 percent. Transportation represents 5.7 percent of the total budget, and entertainment 1.5 percent. All other expenditures account for 18.7 percent of total expenditure. The data in table 10.4 suggest that the share of total consumption allocated to food, human capital, and housing tends to be higher when the household head is female, and when more than 50 percent of the wage income is provided by the spouse. By contrast, when the household head is male or when more than half of the wage income is provided by men, spending for tobacco, alcohol, adult clothing, and entertainment is higher. The question is whether those patterns remain in a regression framework, controlling for a range of factors that may affect consumption choices.

The results of the estimations of equation (10.1) are presented in table 10.5. First note the high degree of variation in the *R*-squared across expenditure categories. For some goods, our specification captures a large share of total variation in expenditure shares across households, but for other goods, the fit is less good. The results suggest that location and family composition often have an impact on consumption choices. For example, households located in the two main cities spend less on food and more on housing, as expected. Richer households tend to spend less on housing and health and more on education, adult clothing, entertainment, and tobacco (although the impact of tobacco is small, with the

Table 10.4 Basic Statistics on Expenditure Shares (%) in the Republic of Congo, 2005

	Sex of head			Female labor income share	
	All	Male	Female	Below 50%	Above 50%
Food	38.8	38.4	40.2	38.2	40.0
Health	4.5	4.4	5.0	4.3	5.1
Education	1.7	1.6	1.9	1.6	1.8
Children's clothing	1.0	1.0	0.9	1.0	0.9
Adult clothing	4.5	4.7	4.0	4.8	3.9
Tobacco	0.2	0.2	0.0	0.2	0.1
Alcohol	1.7	2.0	0.5	1.9	1.1
Housing	21.7	20.8	25.0	20.4	24.3
Transportation	5.7	5.6	5.9	5.8	5.5
Entertainment	1.5	1.7	0.9	1.7	1.1
Other expenses	18.7	19.6	15.6	19.9	16.2

Source: Authors' calculations based on 2005 ECOM household survey.

share allocated to tobacco itself being small), indicating that these goods can be classified as "luxuries" in Congo.

Female-headed households tend to spend a smaller proportion of the household budget on food (the coefficient is almost statistically significant at the 10 percent level) and alcohol. The result for the impact of female headship on food spending may appear surprising at first, but it may be a result of the fact that overall food caloric requirements, as opposed to other requirements for education, health, and other spending, may very well be lower for a household when the head is male.

Several (but not all) results of the coefficient estimates for the Y_F/Y variable reject the income-pooling hypothesis. First, women and men differ in preference in terms of their allocation of the budget to food, suggesting that a bargaining process is undertaken to determine how much of their resources should be allocated to this important expenditure category for human capital development. Controlling for differences in household size, total expenditure, demographic composition, gender of household head, and regional variations, an increase in women's income increases the level of resources allocated to food, with a 1 percent redistribution of wage income from the male head to his spouse increasing the food expenditure share by 0.04 percent. This is small, but nevertheless statistically significant at the usual levels.

The impact for education is even smaller (less than 0.1 percentage point), but, nevertheless, positive and also statistically significant. By contrast, a higher share of total wage income obtained by women decreases spending for adult clothing (by 0.1 percentage point for each percent of additional income share

Table 10.5 Correlates of Household Consumption Shares for Various Items in the Republic of Congo, 2005

	Food			Health			Education			Children's clothing		
	Coefficient	t	P>t	Coefficient	T	P>t	Coefficient	t	P>t	Coefficient	t	P>t
Variables												
Log household size	–0.001	–0.11	0.911	0.001	0.42	0.674	0.018***	9.12	0	0	0.09	0.924
Log p.c. consumption	–0.004	–0.72	0.471	–0.006***	–2.85	0.004	0.003**	2.4	0.017	–0.001	–1.42	0.154
Female income share	0.036**	2.49	0.013	0.002	0.36	0.718	0.006*	1.92	0.055	0	–0.22	0.826
Female head	–0.026	–1.64	0.101	0	0.03	0.98	0.002	0.62	0.534	0.003	1.39	0.165
Boys below age 5	–0.068	–0.89	0.373	–0.013	–0.48	0.632	0.012	0.68	0.496	0.041***	4.35	0
Girls below age 5	0.004	0.05	0.962	–0.009	–0.34	0.731	–0.006	–0.32	0.745	0.037***	3.99	0
Boys aged 6–14	–0.098	–1.32	0.188	–0.037	–1.47	0.142	0.036**	2.11	0.035	0.016*	1.71	0.087
Girls aged 6–14	–0.104	–1.41	0.159	–0.014	–0.53	0.595	0.041**	2.45	0.014	0.02**	2.24	0.025
Men aged 15–69	–0.149**	–2.12	0.034	–0.028	–1.17	0.243	0.02	1.25	0.211	0.01	1.19	0.234
Women aged 15–69	–0.120*	–1.73	0.084	–0.021	–0.88	0.379	0.022	1.36	0.173	0.009	1.11	0.267
Men aged above 60	–0.219*	–1.71	0.088	0.062	1.41	0.157	0.012	0.41	0.682	0.007	0.42	0.675
Pointe Noire	–0.051***	–4.85	0	0.006*	1.75	0.08	–0.001	–0.24	0.811	0.001	1.1	0.272
Other urban areas	–0.025**	–2.21	0.027	0.007*	1.92	0.055	–0.009***	–3.67	0	0.003*	1.87	0.062
Semi-urban areas	0.011	0.78	0.437	–0.001	–0.18	0.86	–0.017***	–5.54	0	0.002	1.18	0.237
Rural areas	0.042**	2.43	0.015	–0.005	–0.89	0.376	–0.022***	–5.53	0	0.001	0.4	0.693
Constant	0.536***	5.13	0	0.126***	3.51	0	–0.061**	–2.55	0.011	0.005	0.37	0.712
Number of observations	1384			1384			1384			1384		
R^2	0.058			0.024			0.150			0.062		

continued

Table 10.5 Correlates of Household Consumption Shares for Various Items in the Republic of Congo, 2005 *continued*

	Food			Health			Education			Children's clothing		
	Coefficient	t	P>t	Coefficient	T	P>t	Coefficient	t	P>t	Coefficient	t	P>t
Variables												
Log household size	–0.001	–0.42	0.674	–0.001***	–2.73	0.006	0.002	0.68	0.496	–0.023***	–4.21	0
Log p.c. consumption	0.014***	6.25	0	0**	–2.2	0.028	0.005***	2.98	0.003	–0.062***	–17.15	0
Female income share	–0.011**	–2.06	0.04	0	0.32	0.751	0.004	0.97	0.333	–0.003	–0.27	0.784
Female head	0.004	0.66	0.509	–0.001	–0.96	0.337	–0.012***	–2.67	0.008	0.013	1.26	0.207
Boys below age 5	–0.003	–0.12	0.908	0.001	0.18	0.856	–0.002	–0.1	0.918	–0.127***	–2.63	0.009
Girls below age 5	0.017	0.59	0.552	0.005*	1.7	0.09	–0.003	–0.12	0.906	–0.15***	–3.14	0.002
Boys aged 6–14	0.002	0.07	0.942	–0.001	–0.3	0.767	–0.001	–0.07	0.948	–0.065	–1.38	0.167
Girls aged 6–14	–0.005	–0.18	0.86	–0.001	–0.21	0.834	–0.02	–0.91	0.361	–0.113**	–2.41	0.016
Men aged 15–69	0.002	0.07	0.942	0.001	0.3	0.762	–0.007	–0.35	0.728	–0.062	–1.4	0.161
Women aged 15–69	–0.01	–0.38	0.703	0.001	0.45	0.653	–0.002	–0.1	0.921	–0.009	–0.21	0.837
Men aged above 60	–0.041	–0.84	0.399	–0.001	–0.31	0.759	–0.045	–1.23	0.218	0.071	0.88	0.379
Pointe Noire	–0.005	–1.21	0.227	0	–0.14	0.893	0.002	0.65	0.518	–0.002	–0.23	0.819
Other urban areas	0.02***	4.62	0	0	0.7	0.481	0	–0.07	0.946	–0.021***	–2.98	0.003
Semi-urban areas	0.022***	4.09	0	0	0.1	0.92	0.013***	3.38	0.001	–0.046***	–5.22	0
Rural areas	0.013**	2.06	0.04	0.002**	2.48	0.013	0.014***	2.9	0.004	–0.044***	–4.05	0
Constant	–0.121***	–3.04	0.002	0.007*	1.85	0.065	–0.049	–1.64	0.101	1.089***	16.5	0
Number of observations	1384			1384			13 84			1384		
R^2	0.060			0.027			0.026			0.201		

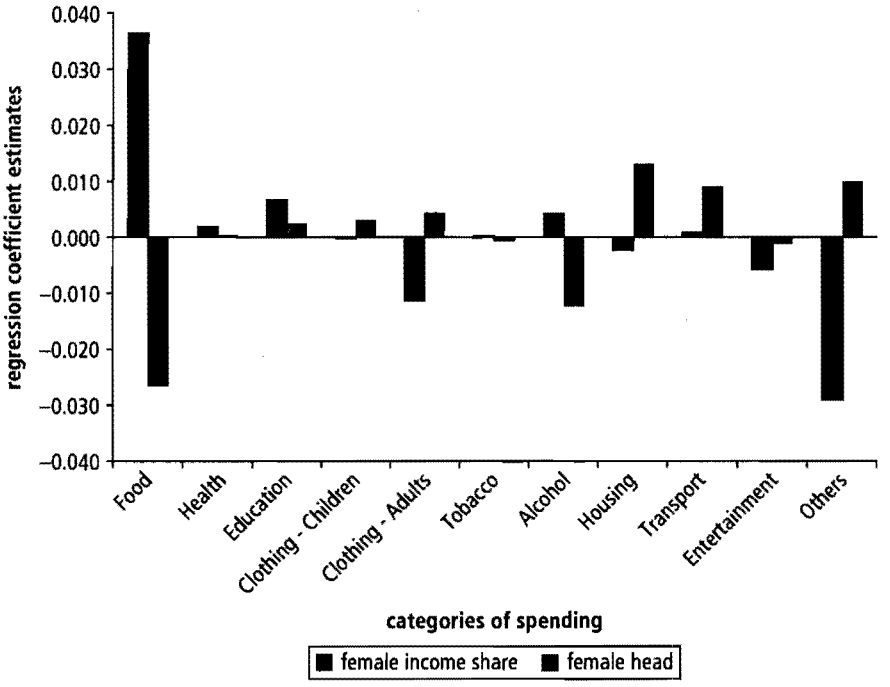
	Transport			Entertainment			Other expenditures		
	Coefficient	t	P>t	Coefficient	T	P>t	Coefficient	t	P>t
Variables									
Log household size	0.004	1.2	0.229	0.006***	3.14	0.002	−0.005	−0.86	0.389
Log p.c. consumption	0.003	1.2	0.231	0.007***	5.32	0	0.042***	9.96	0
Female income share	0.001	0.1	0.919	−0.006*	−1.74	0.082	−0.029***	−2.72	0.007
Female head	0.009	1.36	0.174	−0.001	−0.29	0.772	0.01	0.82	0.414
Boys below age 5	0.027	0.88	0.379	0.014	0.76	0.45	0.119**	2.14	0.032
Girls below age 5	−0.006	−0.21	0.831	0.003	0.19	0.847	0.107*	1.95	0.051
Boys aged 6–14	0.013	0.43	0.67	0.015	0.86	0.39	0.121**	2.23	0.026
Girls aged 6–14	0.019	0.65	0.518	0.022	1.26	0.208	0.152***	2.82	0.005
Men aged 15–69	0.024	0.86	0.391	0.029*	1.73	0.085	0.161***	3.13	0.002
Women aged 15–69	0.011	0.41	0.683	0.013	0.82	0.414	0.105**	2.08	0.038
Men aged above 60	0.048	0.93	0.355	0.037	1.22	0.221	0.07	0.75	0.453
Pointe Noire	0.007	1.62	0.105	0.004	1.7	0.089	0.037***	4.86	0
Other urban areas	−0.036***	−7.94	0	0.013***	4.98	0	0.048***	5.91	0
Semi-urban areas	−0.032***	−5.78	0	0.007**	2.14	0.032	0.041***	4.11	0
Rural areas	−0.026***	−3.75	0	0.007*	1.86	0.063	0.017	1.37	0.17
Constant	0.013	0.32	0.751	−0.103***	−4.19	0	−0.442***	−5.8	0
Number of observations	1384			1384			1384		
R^2	0.097			0.049			0.133		

Source: Authors' calculations based on 2005 ECOM household survey.
Note: (*) denotes statistical significance at the 10% level, (**) at the 5% level, and (***) at the 1% level.

for women), entertainment (by less than 0.1 percentage point), and other expenditures (by close to 0.3 percentage point). The results obtained for the two gender variables in the regressions (the gender of the household head and the female labor income share) are illustrated in figure 10.1 (note that all effects are not statistically significant).

Given the parametric constraint imposed by equation 10.1 (the sum of the slopes for any regressor must equal 1), it may seem odd that only a few of the 11 parameters estimated on Y_F/Y are statistically significant (that is, statistically different from zero), but this has been observed in other instances (see, for example, Bussolo, De Hoyos, and Wodon 2009, on Senegal, where fewer parameters are statistically significant than those here). In order to come up with a summary assessment of the impact of the female labor income share on what can be considered broadly as investments in human capital, we re-estimate equation 10.1 by combining expenditures in two aggregate categories. The human capital category comprises spending for food, education, health, and children's clothing. All the rest is lumped together as the "alternative" category. The results in table 10.6 suggest that a 1 percent increase in the share of female

Figure 10.1 Impact of Gender Variables on Consumption Patterns in the Republic of Congo, 2005



Source: Authors' calculations based on 2005 ECOM household survey.

Table 10.6 Correlates of Household Consumption Shares for Two Aggregated Categories, Republic of Congo, 2005

	Food and human capital			All other expenditures		
	Coefficient	t	P>t	Coefficient	T	P>t
Variables						
Log household size	−0.005	−0.56	0.573	0.005	0.56	0.573
Log p.c. consumption	−0.069***	−12.42	0	0.069***	12.42	0
Female income share	0.042***	2.98	0.003	−0.042***	−2.98	0.003
Female head	−0.011	−0.72	0.471	0.011	0.72	0.471
Boys below age 5	−0.195***	−2.65	0.008	0.195***	2.65	0.008
Girls below age 5	−0.161**	−2.21	0.028	0.161**	2.21	0.028
Boys aged 6–14	−0.164**	−2.29	0.022	0.164**	2.29	0.022
Girls aged 6–14	−0.189***	−2.65	0.008	0.189***	2.65	0.008
Men aged 15–69	−0.220***	−3.24	0.001	0.220***	3.24	0.001
Women aged 15–69	−0.128*	−1.92	0.055	0.128*	1.92	0.055
Men aged above 60	−0.073	−0.59	0.553	0.073	0.59	0.553
Pointe Noire	−0.047***	−4.61	0	0.047***	4.61	0
Other urban areas	−0.048***	−4.43	0	0.048***	4.43	0
Semi-urban areas	−0.053***	−3.99	0	0.053***	3.99	0
Rural areas	−0.029*	−1.75	0.08	0.029*	1.75	0.08
Constant	1.690***	16.77	0	−0.690***	−6.85	0
Number of observations	1384			1384		
R^2	0.16			0.151		

Source: Authors' calculations based on 2005 ECOM household survey.
Note: (*) denotes statistical significance at the 10% level, (**) at the 5% level, and (***) at the 1% level.

labor income would increase total spending for human capital by 0.4 percent. A doubling of the female labor income share from 17 percent to 34 percent could thus increase the share of human capital–related expenditures in households by about 7 percentage points, which is relatively large.

Conclusions

As in many other developing regions, in Africa, labor income tends to be controlled by men. The results presented here show that, when women control a higher share of total labor income within the household, the household tends to allocate larger shares of its resources to investments that benefit their children. For each category of spending taken individually, the magnitude of the links between the female labor income share and the share of total expenditure allocated to a category may not be very large, but for human capital as a whole,

the effect is not negligible. A doubling of the female labor income share from 17 to 34 percent could increase the share of human capital-related expenditures in households by about 7 percentage points, which is relatively large, but at the same time, many of the results obtained for good categories at a lower level of aggregation tend not to be statistically significant.

The evidence here suggests that in the Republic of Congo, as in other countries, the unitary household hypothesis does not hold well. Thus, this study, which has followed closely a similar analysis for Senegal by Bussolo, De Hoyos, and Wodon (2009), brings additional evidence to a growing body of micro-literature that has shown that the income-pooling hypothesis—namely, that what matters to household expenditure patterns is not who brings in the income, but the total available resources—is not supported by the data. This result signals that gender inequalities encompass not just inequalities of opportunities outside the households—such as inequalities in education, employment, labor remuneration, access to credit, and other dimensions—but also inequalities within the household, manifested mainly by inequality of power.

Can policy implications be derived from our results? Not in any specific way, but at a more general level, the results from the study do suggest that policies to boost women's bargaining power within the household could be beneficial for long-term investments in human capital. This could be achieved through educational and media campaigns targeted toward equality within the family, for example. Directing some public transfers directly or indirectly to women or creating access to credit programs with a focus on women could also be considered, although a detailed analysis would be required before making specific recommendations.

Note

1. In developing countries, and especially in Sub-Saharan Africa, income is often difficult to estimate through household surveys because most (or at least a large proportion) of the active population engages in independent and informal activities without keeping good account of the income received from such activities. Much of this income is also received in-kind, and when it is received in cash, it is often irregular, which makes it difficult for households to recall how much they actually earned. Consequently, any analysis of household income must involve a plausibility check, for example, by comparing income to consumption, a variable that is less subject to measurement errors. In the case of Congo's ECOM survey, total income for households is slightly higher than total consumption, and very well correlated to consumption. In most other West and Central African countries, total income as measured through the surveys is only at about half the value of the consumption of households, and thus substantially underestimated.

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