Labor Market Monopsony Power among Africa's Manufacturing Sector

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Labor Market Monopsony

- In the standard competitive model, firms are price takers in the labor market and face a horizontal labor supply curve.
- Since Robinson (1933) first coined the term "monopsony," economist have considered the case where the individual firm faces an upward sloping labor supply curve.
- Historically was thought to prevail in isolated labor markets (eg coal mining towns) and considered to be rare.

- More recently, theoretical models have suggested that an individual firm can face an upward sloping labor supply curve due to lack of competitors (oligopsony), differentiation between firms, variation in worker preference, moving costs, costly job search (Boal and Ransom 1997; Burdett and Mortensen, 1998; Bhaskar, Manning, and To 2002, Manning 2003; Ashenfelter, Faber, Ransom 2010; Mortensen, 2011).

Labor Market Monopsony

- In the "new monopsony" framework, the word monopsony is synonymously used with the following words or phrases: monopsonistic competition, oligopsony, imperfect competition, finite labor-supply elasticity, or upward-sloping labor supply to the firm (Webber, 2015).

General Motivation

- Evidence of sizeable and prevalent labor market monopsony power would suggest that theoretical models of labor market that assume perfect competition should reevaluate their assumptions.

- From the public policy perspective, imperfect competition in the labor market has implications for the effect of institutions such as minimum wage on employment (Card and Krueger 1995; Feldman and Scheffler 1982).

Motivation for studying Africa's Manufacturing Sector

- Most of the existing empirical literature examining labor market monopsony power is focused on formal labor markets of advanced economies.
- Given wage is an important determinant of economic welfare, the significance of labor market monopsony is likely to be even greater in developing countries where most of the world's poor live.
- The problem facing the poor in developing countries is that there is not enough regular wage employment, as opposed to self-employment, for those who are willing and capable to perform them (see Fields, 2011). Indeed, employment in the wage sector is a means for getting out of poverty in developing countries.

Motivation for studying Africa's Manufacturing Sector

- Within the developing country context, we are aware of **only one article** that investigates labor market monopsony power in the manufacturing sector; finding that over half of the firms in Indonesia have significant market power (Brummund, 2013).
- With the African high value-added sector, manufacturing being one, widely being considered as the engine for economic growth and employment generation within policy circles (Filmer and Fox, 2014; Brookings Institute, 2017), the dearth in the empirical literature assessing labor market competitiveness within the sector is rather surprising.
- Evidence of firms behaving monopsonistically in the labor market would suggest that they can play an even greater role in employment generation by behaving more competitively.

Contribution

- In this article, we investigate the extent to which manufacturing firms in four sub Saharan African countries – Cameroon, Ghana, Kenya, and Zimbabwe – exercise monopsonistic market power in the labor market.
- To our knowledge **this is the first estimate** of monopsonistic behavior in the labor market by manufacturing firms from sub Saharan Africa.
- We also conduct a benchmarking exercise to **assess the approximate deadweight loss**, relative to perfect competition, for the average firm in the sample for each country.

The Model

The firm chooses employment to maximize profits:

$$\pi = R(L) - W(L)L \qquad (1),$$

where π is profits, R is total revenue, W is wages, and L is labor. The first order condition for profit maximization can be written as:

$$R'(L) = W(L) + LW'(L) \qquad (2),$$

where $R'(L)$ is the marginal revenue product of labor, and the right-hand side is the marginal cost of labor to the firm, with $W(L)$ being the inverse supply curve. Rearranging the terms in (2) and dividing both sides by *W(L)*, one obtains Pigou's rate of exploitation (*E*) to be:

$$E = \frac{R'(L) - W(L)}{W(L)} = \frac{LW'(L)}{W(L)} \qquad (3).$$

The Model

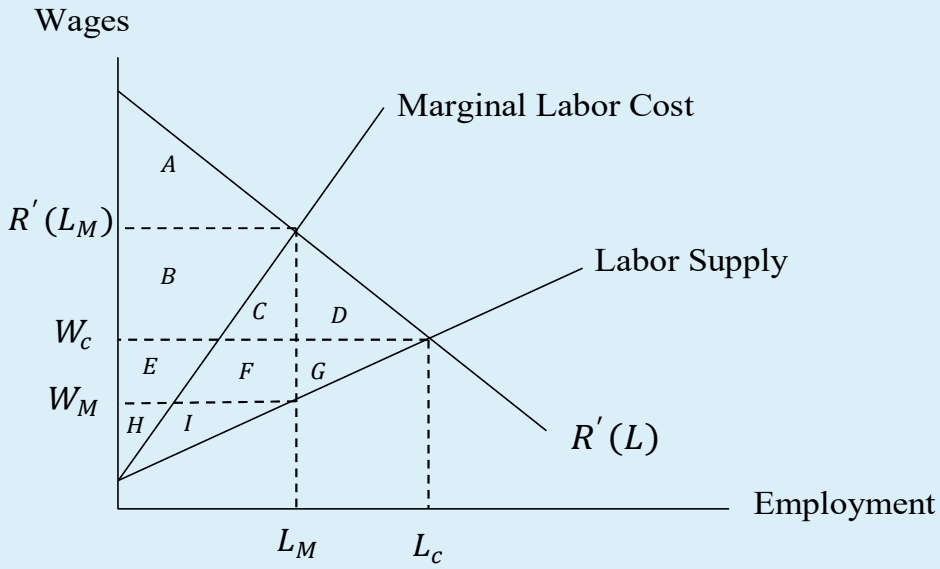
Pigou's rate of exploitation (E) is:

$$E = \frac{R'(L) - W(L)}{W(L)} = \frac{LW'(L)}{W(L)} \qquad (3).$$

- Once we estimate the production function, we obtain $R'(L) = \frac{\partial Y}{\partial L} = \beta_L \frac{Y}{L}$, where Y and L are output and labor in their levels. We evaluate $R'(L)$ at the firm level data and plug it into (3) along with firm level wages to obtain Pigou's measure of monopsonistic behavior.

- In a perfectly competitive setting, firms will hire labor up to the point where $R'(L) = W(L)$ and Pigou's measure (E) will be zero.
- Whereas in the presence of monopsonistic behavior, $W'(L)L > 0$, Pigou's measure will be strictly positive.
- Notice that $\frac{LW'(L)}{W(L)}$ in (3) is the inverse of labor supply elasticity (ϵ). As such, one can succinctly write $E = \epsilon^{-1}$. Note that perfect competition is a limiting case as $\epsilon \to \infty \; and \; E \to 0$.

Figure 1: Wage and Employment under Monopsony



Using our estimate for $R'(L_M)$, and data on W_M and L_M, we can assess an approximate efficiency change (changes in employer and employee rent) and the associated deadweight loss, relative to perfect competition. Here the approximate change in employer rent is *E*+*F*-*D*, change in employee rent is -*E*-*F*-*G*, and deadweight loss is -*D*-*G*.

Empirical Model of Firm Productivity

We assume each firm's production technology takes the Cobb-Douglas form $Y_{it} = AL_{it}^{\beta_L} K_{it}^{\beta_K}$ where Y_{it} denotes output for firm i at time t such that $i = 1,2, \dots, n$ and $t = 1,2, \dots, T$, L_{it} and K_{it} denote labor and capital, and A is total factor productivity. We estimate the log-transformed specification

$$y_{it} = \beta_L l_{it} + \beta_K k_{it} + \omega_{it} + \mu_i + v_{it} \quad (4)$$

We define ω_{it} to be possibly autoregressive firm-specific productivity shock, μ_i to be a time-invariant firm-specific heterogeneity parameter that may be correlated with l_{it} or k_{it}, and v_{it} is the serially uncorrelated measurement error. The presence of ω_{it} leads to an endogeneity problem; we generate internal instrumental variables using GMM estimators (e.g., Anderson and Hsiao 1982, Arellano and Bond 1991, Arellano and Bover 1995, and Blundell and Bond 1998) based on moment restrictions.

Parametric System-GMM Identification Strategy

We generate internal instrumental variables following the System-GMM approach (Blundell and Bond 1998). System-GMM method constructs a stacked system of equations based on a differenced y_{it} and y_{it} in levels, using instruments based on both lagged levels and lagged differences of y_{it}. This system approach has been shown to outperform alternative GMM strategies (e.g., Arellano and Bond 1991) such as using only lagged differences for instrumental variables (see discussions in Blundell and Bond 1998).

Finally, we can recover back the structural parameters using the standard minimum distance techniques, imposing common factor restrictions.

Data

Regional Program for Enterprise Development (RPED) database that is made available by the Center for the Study of African Economics at the University of Oxford. Surveys in African countries during the 1990s. While a number of studies analyze these surveys (e.g, Bigsten et al., 1999, a, b; Bigsten et al., 2000; Teal, 2000; Soderbom and Teal, 2001, a, b; Velde and Morrissey, 2003; Strobl and Thornton, 2004), none address the research question raised in this article.

- The dataset consists of three years of employer-employee matched panel data for manufacturing firms from five African countries: Cameroon, Ghana, Kenya, Zambia, and Zimbabwe.

Data

The data is from the 1993- 1995 for all countries, except for Ghana, where survey was conducted over 1992-1994. Workers in the manufacturing establishments were interviewed in parallel with the firm level survey, making it possible to match worker characteristics with firm level characteristics.

At the firm level, data on output, input, and details of work force was collected. The variables used to estimate production function include output in terms of value added (US PPP dollars), total number of employees in the firm, and physical capital defined as the replacement value of plant and equipment (US PPP dollars). There also information in the dataset about the sector (food, furniture, textile, metal), location (whether the firm is in the capital city) and ownership (whether there is some state or foreign ownership).

Table 1: Summary Statistics

Variable	Cameroon	Ghana	Kenya	Zimbabwe
Output (Value Added US PPP $)	1786811 (4263929)	279543.6 (989006.4)	2501116 (6229119)	5643880 (1.76e+07)
Labor	84.46 (200.55)	35.98 (65.47)	84.95 (156.40)	302.93 (485.95)
Capital (US PPP $)	2131147 (4448946)	387047.6 (1421018)	2193286 (4274473)	8748069 (3.23e+07)
CapCity	0.65 (0.478)	0.479 (.500)	0.628 (0.484)	0.522 (0.500)
AnyFor	0.35 (0.478)	0.156 (0.363)	0.185 (0.389)	0.247 (0.432)
AnyStat	0.066 (0.250)	0.031 (0.174)	0.014 (0.118)	0.055 (0.228)
Monthly Wages (US PPP $)	388.839 (292.078)	154.912 (118.641)	418.105 (347.909)	429.872 (358.051)
N	60	96	70	109

Table 2 a: Production function estimates with log (value added) as the dependent variable –Reduced Form

	Cameroon (1)	Ghana (2)	Kenya (3)	Zimbabwe (4)
y_{t-1}	0.378* (0.222)	0.314 (0.297)	0.098 (0.195)	-0.127 (0.125)
l_t	0.594** (0.294)	0.483* (0.275)	0.606 (0.374)	0.798*** (0.190)
l_{t-1}	-0.005 (0.508)	-0.093 (.277)	-0.115 (0.428)	0.396 (0.246)
k_t	0.229 (0.161)	0.124 (0.147)	0.314 (0.268)	0.098 (0.172)
k_{t-1}	0.101 (0.117)	0.109 (0.091)	0.317* (0.173)	0.094 (.069)
Hansen	0.264	0.749	0.809	0.853
N	60	96	70	109

Table 2 b: GMM parameter estimates imposing the common factor restrictions-Structural Parameters

	Cameroon (1)	Ghana (2)	Kenya (3)	Zimbabwe (5)
y_{t-1}	0.546*** (0.128)	0.568*** (0.183)	0.201*** (0.049)	-0.215*** (.058)
l_t	0.701*** (0.265)	0.481* (0.259)	0.618* (0.315)	0.871*** (0.162)
k_t	0.149 (0.144)	0.099 (.143)	0.253 (0.236)	0.141 (0.154)
Comfac	0.535	0.544	0.848	0.727
CRS	0.957	0.910	0.972	0.998

Table 3: Pigou's measure of Market Power(*E) and Labor Supply Elasticity* (ϵ)

	E	ϵ
Cameroon	1.892	0.528
Ghana	0.815	1.226
Kenya	2.274	0.439
Zimbabwe	1.557	0.642

Table 4: Employer and Employee Rent Sharing

	Cameroon (1)	Ghana (2)	Kenya (3)	Zimbabwe (4)
Approximate Change in Rent Relative to Perfect Competition				
Employer	245530.74	15081.05	333867.53	392573.16
(%)	(19.81)	(12.60)	(21.42)	(13.32)
Employee	-420079.8	-26382.2	-568979.00	-684908.82
(%)	(-58.04)	(-43.85)	(-62.25)	(-44.72)
Deadweight Loss	174549.11	11301.12	235111.46	292335.66
(%)	(8.89)	(6.28)	(9.51)	(6.53)

Conclusions

- For Cameroon, Ghana, Kenya, and Zimbabwe there is suggestive empirical evidence for the existence of labor market imperfections
- The mean estimates of market power suggest that the marginal revenue product of the average worker is somewhere between 2.27 to 3.327 times higher than their wage
- The implied labor supply elasticity facing the average firm range from 0.43 to 1.22
- Departure from the perfectly competitive market structure leads to approximately 43.85 to 62.25 % lower rent for the worker

Implications

- If we are to assume that job creation is one of the primary concerns of policy makers and development partners of Africa, then incorporating antitrust policies within the broader discourse of development policy agenda might be a step towards the right direction.
- While we do not go as far as to recommend specific policies, it does seem that institutions such as minimum wage and unions possess the potential to raise employment and wages.
- Redistribution of rents from the employer to the worker is likely to have positive welfare effects on the working poor.
- At the very least, this research suggests that there is room for more efficient functioning of the labor market.