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**Business Dynamics and Informal Contracts: Experimental Evidence from the Cowpea Street Food Sector in West Africa**

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## BACKGROUND

- The many unofficial and unwritten agreements found throughout West Africa and the rest of the developing world are extremely important but often overlooked.
- These informal contracts drive the behavior of trading parties (Baker et al. 2002; Brown et al. 2004), particularly in informal markets.
- Informal contracts are used extensively for all types of business dealings and involve both business to business (B2B) transactions of all sizes and business to consumer (B2C) transactions.
  - For example a consumer who always buys from the same street food vendor each day may receive, in return for the regular business, additional product or service, while input suppliers in a B2B situation may sell on credit to long term customers.
- In West Africa women street food vendors are a critical component of the informal economy (reference).
- Kossai, a deep fat fried fritter made from ground cowpea (known as black-eyed peas in the US), is a common product that is purchased daily by consumers of all age, income and cultural groups.
- The production of Kossai involves multiple stages and is labor intensive.
- In addition to regular interactions (repeat contracts) that the women have with their customers they also have regular interactions with input suppliers who sell them the cowpeas and grind the cowpea into a paste for batter.
- Kossai vendors, use different types of informal contracts to increase the efficiency of their transactions.
- Experimental economics has become an important tool in studying economic behavior such the role of incentives on market transaction efficiencies (Dufo, 2005; Levitt and List, 2008).



## PROBLEM

Potential Hold up Problem



An informal contract exists for every woman vendor/grinder combination as a result of their regular interaction.

Grinding of the cowpeas is a Critical Stage in Kossai Production

Initial observations indicate that kossai vendors use different contractual structures to motivate trade efficiency in their transactions with grinders.

## OBJECTIVE

The objective of this paper is to test the ex-ante and ex-post efficiencies of the different contractual structures using field experiments in market transactions between kossai vendors and the grinders (their key input suppliers).



## Methodology

### Type of Contracts:

**Gift Contracts** are equivalent to an up-front payment or "tip" over an above the base fee that the woman vendor pays the grinder to secure the services to have her cowpeas ground that day.  
**Standard Pricing Contract** is the common, widely known fixed fee that the grinder charges to grind a given amount of cowpea.  
**Discretionary Bonus Contracts** involve a deferred payment of the base fee plus a bonus. This total amount is paid at the end of the day after the vendor has received revenue from her sales.

	Discretionary Bonus Contract (DBC)	Standard Pricing Contract (SP)	Gift Contract (GC)
Nature of Contract	Most Incomplete	More Complete	More Complete
Contract Efficiency	Ex-ante Efficient	Ex-ante Efficient	Ex-ante Efficient

## DATA and EXPERIMENTAL DESIGN

- Experimental approach replicates field situations by engaging kossai vendors and grinders in real market transactions.
- Field experiment employed 64 kossai vendors in Niamey, Niger in December 2009
- Each vendor engaged in 5 transactions → 320 possible trades
- For each transaction the vendor arrived a bit later than usual to have her cowpea ground resulting in a non standard contract
- Each vendor was provided with 100F per transaction to cover the incremental cost associated with the non standard contract.
- Actions and choices of contractual structures (gift, base fee, discretionary bonus) offered to the grinder were at the discretion of the vendor to permit optimal decision making.
- Data collected on variables included types of contracts offered and accepted, quality of service provided by grinders, cost of market transactions and payment choices, business and personal characteristics and market operations of kossai enterprises.



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## Hypotheses and Expected Results

- H1: Gift Contracts are more ex-ante efficient (i.e. they are good at motivating contract acceptance because this contract provides up-front credibility and guarantees the return to the grinder)  
 H2: Discretionary Bonus Contracts are more ex-post efficient (i.e. they are good at inducing high quality service because the grinder will not receive the payment until after the grinding service is provided and the quality of service is observed by the vendor)  
 H2a: Average contracted quality should be higher under Discretionary Bonus Contract than Standard Price Contract or Gift Contract  
 H2b: Seller deviation from contracted quality should be smaller under Discretionary Bonus Contract than the Standard Price Contract or Gift Contract

## RESULTS

### a) Ex-Ante Efficient Contractual Structures

	Number of Contracts Offered (% of total)	Number of Contracts Accepted (% of total)
Gift contract (GC)	54 (17%)	52 (18%)
Standard Price contract (SP)	102 (32%)	102 (35%)
Discretionary Bonus contract (DBC)	164 (51%)	134 (47%)
<b>Total Number of Possible Trades</b>	<b>320</b>	<b>288</b>

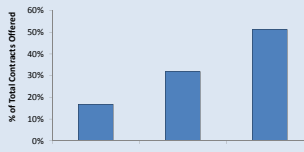


Figure 1: Percentage of Contracts Offered  
Kossai vendors prefer discretionary bonus contracts (51% of contracts offered) which are more complete from their perspective.

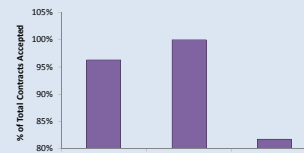


Figure 2: Percentage of Specific Contracts Offered that were Accepted  
Contracts that are more complete in nature (gift contract and standard price contract) are ex-ante efficient, that is, they are good at motivating contract acceptance.

We observe relatively higher contract acceptance rates under the gift contract and standard price contract (96% and 100% respectively) in comparison to the discretionary bonus contract.

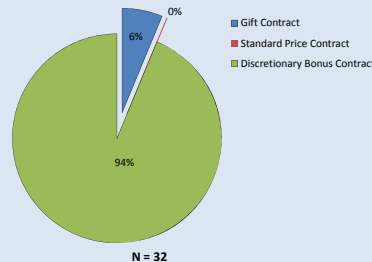


Figure 3: Percentage of Total Number of Rejected Contracts

### b) Ex-Post Efficient Contractual Structures

	No. of trades	Avg. Contracted Quality, Q	Avg. Actual Quality, q	Avg. size of shortfall, Q-q	No. of Trades, q<Q	% of trades where q<Q (specific contracts)
Gift Contract	52	2.65	2.10	0.56	28	53.85%
Standard Price Contract	134	2.66	2.25	0.42	62	46.27%
Discretionary Bonus Contract	134	2.76	2.91	-0.15	6	4.48%
<b>Average of Total</b>	<b>-</b>	<b>2.70</b>	<b>2.50</b>	<b>-</b>	<b>-</b>	<b>-</b>

Quality of service is defined by the degree of homogeneity of the ground cowpea batter and the level of contamination with other products (e.g. millet, sorghum). In this research this is measured as the women's perception. Contracted quality is the expected quality while actual quality is what they experienced.



Women street food vendors waiting in line for service from grinder



A typical grinder



Figure 3: Average Levels of Contracted Quality and Actual Quality

Average actual quality is highest under DBC, followed by SP and then GC. Discretionary bonus contracts are more ex-post efficient, that is, they are good at inducing high quality of service.

Increasing the degree of contractual incompleteness permits the vendor to self-enforce the grinder to deliver high quality of service.

	Hypothesis: $H_0: q_{DBC} > q_{GC}$	Chi-Square
	Hypothesis: $H_1: q_{DBC} > q_{GC}$	
	P-Value	
$H_0: q_{DBC} = q_{GC}$	<0.0001	84.93***
$H_0: q_{SP} = q_{GC}$	0.22	1.45
$H_0: q_{SP} = q_{DBC}$	<0.0001	70.88***
$H_0: q_{SP} = q_{GC} = q_{DBC}$	<0.0001	97.45***

	Hypothesis: $H_0: Q-q_{DBC} > Q-q_{GC}$	Chi-Square
	Hypothesis: $H_1: Q-q_{DBC} > Q-q_{GC}$	
	P-Value	
$H_0: Q-q_{GC} = Q-q_{SP}$	0.3	1.06
$H_0: Q-q_{SP} = Q-q_{DBC}$	<0.0001	89.92***
$H_0: Q-q_{GC} = Q-q_{DBC}$	<0.0001	35.33***
$H_0: Q-q_{GC} = Q-q_{SP} = Q-q_{DBC}$	<0.0001	57.92***

Kruskal-Wallis test to test for significant differences in actual quality and average deviation of quality across contractual structures.

The difference in quality is statistically significant between the DBC and SP, between DBC and GC as well as between the pooled SP/GC and DBC. There is no evidence that  $q_{GC} = q_{SP}$ . This may be because GC and SP are similar in structure and provides the grinder with discretionary latitude to deviate from the contract.

These results are consistent for test for differences in the average deviation across the different contractual structures.

## CONCLUSIONS

Kossai vendors prefer discretionary bonus contracts that are more complete from their perspective. The use of this contract enables them to self-enforce high quality of service.

Gift contracts and standard price contracts are ex-ante efficient but are, however associated with lower quality of service.

Discretionary bonus contracts are ex-post efficient but are associated with low contract acceptance rates.

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