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Retailing of processed foods in Mali: Evidence from a city-retail outlet inventory

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Motivation

Consumers are shifting towards processed foods (Hollinger and Staatz 2015).

Income increases are associated with growth in foods with high-income elasticities of demand (Zhou and Staatz 2016).

Processed foods play a central role in diet transformation and retailing modernization (Tschirley et al. 2015; Reardon et al. 2015).

Imports prevail in processed food sectors of other African countries. (Liverpool-Tasie et al., 2016; Andam et al., 2015; Ijumba et al., 2015).

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Objective

Examine the diversity, availability, and competitiveness of retailed processed foods.

- Descriptive and hedonic price analysis

Processed food is “A retail item derived from a covered commodity that has undergone specific processing resulting in a change in the character of the covered commodity, or that has been combined with at least one other covered commodity or other substantive food component.” (USDA 2017; 7 CFR § 65.220)

Focus: cereal grains and dairy.

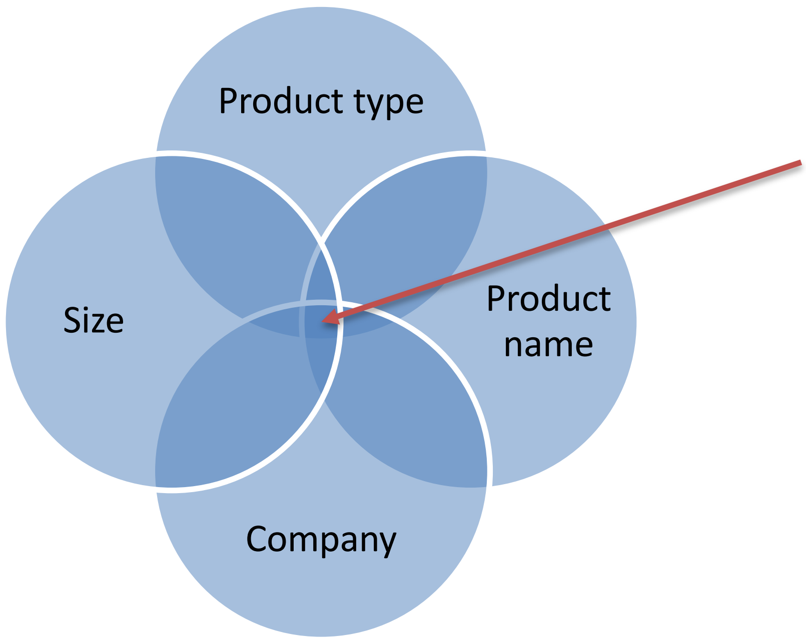
Sampling and Methods

25 neighborhoods across 3 wealth levels

100 retail outlets:

- Supermarkets
- Grocery stores
- Traditional shops
- Neighborhood & central markets

Unit of analysis



Unique "Product"
N = 4,000

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Results: Diversity

Pasta, cookies/crackers > 20% of grains.

Milk powders ~ 20% of dairy.

Grains			Dairy		
	Products	Firms		Products	Firms
1-Bachi djalan	6	5	1-Butter and cream	19	11
2-Bendegue/Degue	24	11	2-Evaporated and condensed milk	58	34
3-Bread	19	11	3-Fene	7	3
4-Broken rice	78	19	4-Flavored milk	9	4
5-Cake	46	19	5-Fresh cheese	6	4
6-Corn-based breakfast cereal	32	16	6-Ghee	3	1
7-Couscous	62	35	7-Hard cheese	4	2
8-Crackers and cookies	365	122	8-Ice cream	12	1
9-Didegue	2	2	9-Fermented milk	17	8
10-Djouka	19	15	10-Milk-based drink	4	3
11-Flour-based breakfast cereal	27	18	11-Pasteurized milk	10	3
12-Infant formula	37	8	12-Powdered milk	182	32
13-Maize chips	39	12	13-Soft cheese	15	9
14-Maize flour	10	8	14-Sterilized (UHT) milk	116	27
15-Maize semolina	22	10	15-Yoghurt	75	23
16-Milled fonio	12	1	Total- dairy category	537	
17-Milled maize	6	2			
18-Milled millet	2	1			
19-Milled rice	20	8			
20-Milled sorghum	3	1			
21-Milled wheat	8	4			
22-Millet flour	8	6			
23-Monikourou	11	9			
24-Parboiled rice	22	10			
25-Pasta	193	76			
26-Perfumed rice	15	7			
27-Popcorn	30	14			
28-Pre-cooked fonio	20	17			
29-Rice porridge	3	3			
30-Rice vermicelli	3	3			
31-Rice-based breakfast cereal	4	3			
32-Rice-based cookie	10	4			
33-Sorghum semolina	4	1			
34-Sweet corn	7	5			
35-Wheat flour	33	12			
36-Wheat vermicelli	38	17			
Total- grain category	1240				

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Results: Availability

Greater availability of products (especially for dairy):

- In Bamako
- In higher-income neighborhoods
- In supermarkets

	Grain Products					Dairy Products				
	Low	**Middle**	**High**	**Total**	R^2	**Low**	**Middle**	**High**	**Total**	R^2
Central Market	-	103	80	171	0.58	-	70	49	102	0.14
Supermarket	-	67	301	360	0.13	-	61	155	186	0.02
Grocery Store	122	181	210	421	0.07	102	134	171	275	0.12
Traditional Store	114	102	117	272	0.00	78	59	72	148	0.04
Neighborhood Market	141	144	134	333	0.08	54	60	55	131	0.11
Total	328	485	725	1,246	0.09	176	254	347	538	0.09
R^2	0.34	0.64	0.73	0.70	-	0.37	0.55	0.46	0.49	-

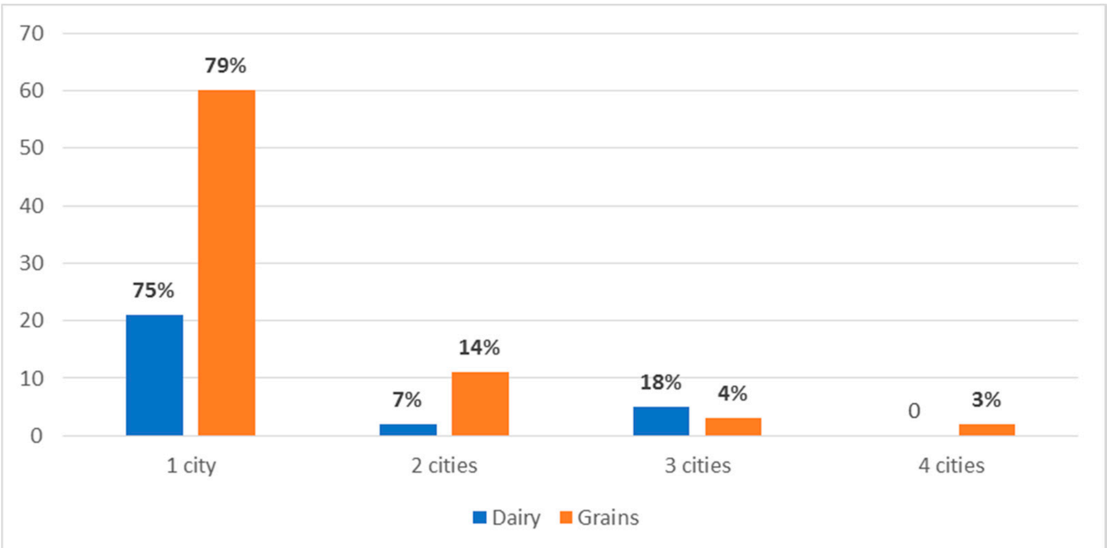
Results: Origin

Imports dominate the number of local products, especially in supermarkets.

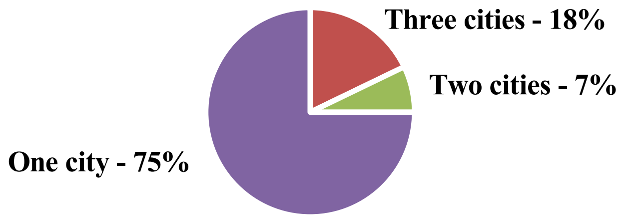
Region	Supermarket		Grocery Store		Traditional Store		Neighborhood Market		Central Market		Total	
	Dairy	Grain	Dairy	Grain	Dairy	Grain	Dairy	Grain	Dairy	Grain	Dairy	Grain
Mali	23	63	53	85	30	63	10	92	12	36	128	339
Africa	4	41	42	72	13	66	13	74	8	32	80	285
Europe	105	203	82	123	24	19	30	46	26	10	267	401
Asia	2	19	24	62	13	50	7	45	3	19	49	195
Americas	3	1	7	3	0	4	1	2	1	4	12	14
Total	137	327	208	345	80	202	61	259	50	101	536	1234

Results: Firm Presence

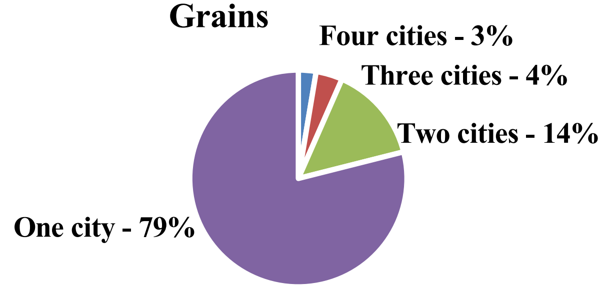
Only ~100 Malian firms, and with limited distribution.



Dairy



Grains



Results: Packaging

Plastic packaging is used for 2/3 of inventoried items.

Almost 1/2 of products in supermarkets have enhanced packaging.

Results: Ingredients

Nearly all products provide a list of primary ingredients.

> 1/3 of products contain added vegetable fat as a top-three ingredient.

> 1/5 of products contain added sugar as a top-three ingredient.

Traditional products are less likely to contain these as key ingredients.

Results: Pricing

Hedonic pricing model to analyze prices for six product types (Rosen 1974; Lancaster, 1966).

Product attributes associated with price premiums or discounts:

- Size (-)
- Plastic bag packaging (-)
- Manufactured in Europe, Nestle (+)
- Sold in supermarkets (+)

Conclusions

1. Market opportunities exist for local value chains, but imports dominate.

2. Constraints to competitiveness:
   - Few firms
   - Limited distributional reach
   - Weak product quality and packaging options

3. Alarming prevalence of added sugars and fats.

4. Agrifood system transformation still at an early stage in Mali.

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Thank you!

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Collaborators

- Naman Keita
- Students from IPR

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Table 4. Hedonic price regressions for processed dairy and grain products (FCFA/kg).

	Milk Powder	Sterilized Milk	Baby Formulas [+]	Pastas	Rice	Cookies/Crackers [+]
Size (kg)	−186.2 ***	−186.4	1493.6	−243.9 ***	−3.45 ***	−531.2
	(26.8)	(196.4)	(1246.3)	(88.5)	(0.9)	(357.0)
Expiration date stamp	522.3	340.0 **	666.9	−8777.5 ***	29.2	246.0
(=1; else = 0)	(634.0)	(130.5)	(583.1)	(2986.1)	(44.0)	(736.7)
Nestle brand	1892.3 ***		107.6			
(=1; else = 0)	(147.0)		(374.8)			
Added vegetable fat [1]	726.8 ***					−494.6 **
(=1; else = 0)	(155.3)					(229.8)
Added sugar [1]			−321.4 *			529.8 *
(=1; else = 0)			(191.1)			(308.3)
Improved packaging [2]	692.9 ***	632.5 **	880.6 *	1690.2 **		119.5
(=1; else = 0)	(179.9)	(281.1)	(468.8)	(643.9)		(409.9)
Special pasta shapes [3] or long				494.8 ***	104.7	
polished rice [4] (=1; else = 0)				(170.5)	(72.7)	
Europe [5]	1070.8 ***	231.5	4078.1 ***	−249.9	1657.1 *	3276.5 ***
(=1; else = 0)	(236.5)	(190.5)	(850.7)	(321.1)	(826.2)	(589.9)
Asia [5]	−7.4	−172.2	1737.9	−1301.4	97.8 *	2018.8 ***
(=1; else = 0)	(534.9)	(311.6)	(1082.5)	(1126.4)	(61.9)	(595.2)
Americas [5]	−170.5	−548.9	3540.87 ***		44.2	−2223.0
(=1; else = 0)	(299.9)	(686.9)	(1124.1)		(66.8)	(2328.9)
Other African country [5]	165.2	293.6 *	4135.8 ***	−539.0	165.8 *	608.4
(=1; else = 0)	(343.2)	(156.6)	(905.6)	(410.1)	(85.6)	(571.2)
Kayes [6]	−43.1	271.1 *	616.8 ***	−248.1	−18.5	−103.2
(=1; else = 0)	(159.9)	(152.7)	(218.7)	(194.5)	(27.8)	(364.8)
Sikasso [6]	298.6 **	98.1	887.0 ***	−249.1	78.4 ***	210.8
(=1; else = 0)	(136.3)	(153.1)	(238.2)	(321.5)	(27.4)	(299.1)
Segou [6]	−566.8 ***	201.4	286.8	187.1	−44.0	−136.8
(=1; else = 0)	(113.6)	(173.0)	(240.8)	(200.1)	(30.6)	(426.3)
Central market [7]	86.0	540.8	145.8	−493.2	0.26	485.5
(=1; else = 0)	(177.83)	(335.7)	(406.9)	(703.8)	(29.1)	(709.3)
Supermarket [7]	876.3 **	1036.4 **	720.3 **	1711.7 ***	771.4 ***	2258.8 ***
(=1; else = 0)	(388.2)	(411.8)	(313.1)	(377.5)	(208.7)	(365.55)
Grocery store [7]	118.2	4.5	103.9	31.2	334.4 ***	708.5 **
(=1; else = 0)	(167.4)	(126.9)	(256.0)	(250.3)	(109.6)	(288.1)
Neighborhood market [7]	−149.7	−70.1	315.1	696.8*	19.4	561.6
(=1; else = 0)	(237.2)	(123.6)	(338.3)	(330.3)	(17.8)	(419.2)
Medium-income [8]	−254.5 *	−356.0 *	117.6	573.4	6.8	379.6
(=1; else = 0)	(153.7)	(209.6)	(215.5)	(655.2)	(23.9)	(318.4)
High-income [8]	29.9	217.0 *	198.8	108.9	83.1 **	565.5 **
(=1; else = 0)	(136.6)	(130.01)	(216.5)	(453.4)	(39.5)	(294.4)
Constant	2740.7 ***	534.0 ***	−517.9	9540.0 ***	270.7 ***	450.9
	(722.9)	(73.7)	(1022.4)	(2947.5)	(47.3)	(910.2)
# of obs.	793	141	151	574	214	505
Adjusted R^2	0.52	0.34	0.82	0.41	0.73	0.37