

Coffee Price Volatility and Intra-household Labour Supply: Evidence from Vietnam

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Introduction

- Volatility in commodity markets poses risk to smallholder farmers in developing countries
- HH use a variety of mechanisms to tide over temporary income fluctuations:
 - wage employment, credit, hh enterprises, asset sales, informal networks etc.
 - often necessitates reallocation of labor within the household

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- What are the patterns of intra-household labor supply allocations?
What is the burden borne by children and adolescents?
- What is the scope for public intervention to mitigate these effects?

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- What are the patterns of intra-household labor supply allocations?
What is the burden borne by children and adolescents?
- What is the scope for public intervention to mitigate these effects?
- We investigate this using a sample of coffee-farmers in the Central Highlands region of Vietnam

Background

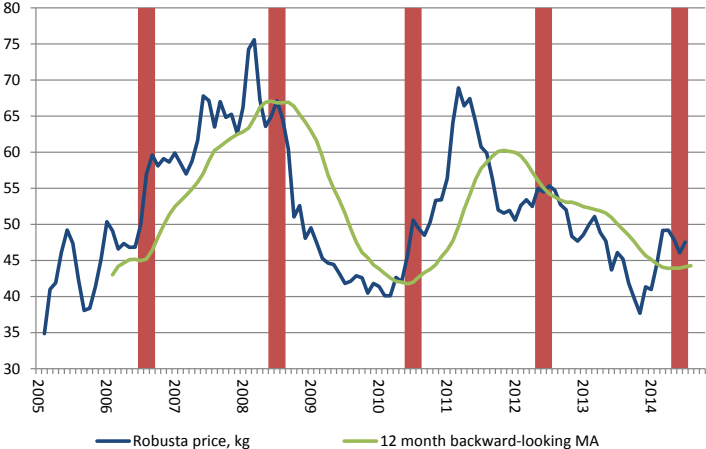
Coffee in Vietnam:

- Only Robusta (not arabica)
- Second largest producer of coffee in the world (largest for robusta)
- Almost solely produced in the Central Highlands region

Coffee cultivation:

- the first crop can be harvested around three years after planting
- risky investment: costly to cut down trees - difficult to switch in and out of coffee
- International coffee prices are volatile
 - Driven by supply shocks (weather); interest rates and expectations (speculation); demand shocks (technology)

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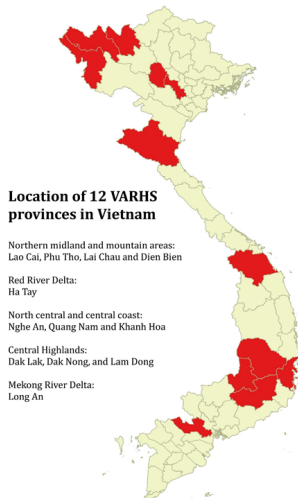


US cents per Kg (Source: International Coffee Organization)

Vietnam Access to Resources Household Survey (VARHS)

- Panel survey, conducted every 2 years 2006-2014
- Households were added in 2008, 2012
- Survey conducted in 12 provinces during the same months (May-Sept)
- Sample restricted to:
 - 3 provinces in the Central Highlands: Dak Lak, Dak Nong & Lam Dong
 - HH. that harvested coffee at least once over 2006-2014
- Unbalanced panel at HH. level
- Low attrition: 0% - 1.6% from round to round

Survey Area



Summary Statistics

Variable	Mean	SD
Real Coffee Price/SD	6.748336	1.24
Real Food Exp. (monthly, '000 Dongs)	1540.09	1055.187
Asset Index	0.522	1.3826
HH size	4.88	1.74
Natural shock	.479	.499
Health shock	.208	.406
Pest attack	.509	.50
Coffee produced, kg	2316	3922
HH engages in wage work (=1)	0.58	.493
HH engages in household business (=1)	0.16	.365
Child engages in wage work (=1)	0.01	.08
<hr/>		
Number of household 2006		209
Number of household 2008		518
Number of household 2010		515
Number of household 2012		562
Number of household 2014		553
Number of household-year observations		2355

Estimation Strategy

$$y_{it} = \alpha + \beta p_{mt} + \gamma_c t + \mu x_{it} + \eta_i + \epsilon_{it}$$

- p_{mt} : 12 month backward looking average of the international robusta coffee price, divided by its s.d. over the survey period (varies month-to-month)
- X_{it} : HH level time varying shocks: crop loss due to pests, illness or death, natural disaster; hh size & hh size sq.
- $\gamma_c t$: province-specific linear time trend
- η_i : Fixed effects - household/individual
- standard errors clustered at commune level

Results: Household Level

	Farm-gate price/SD	Food Exp.	Asset Index	Wage work
Price/SD	0.128*** (0.008)	47.953*** (16.752)	0.049** (0.020)	-0.037*** (0.008)
Constant	0.088 (0.122)	-343.564 (266.773)	-2.243*** (0.254)	0.358*** (0.132)
Province time trend	Yes	Yes	Yes	Yes
HH controls	Yes	Yes	Yes	Yes
HH FE	Yes	Yes	Yes	Yes
R-Square	0.13	0.067	0.27	0.046
N	1922	2355	2355	2355

Intra-household labor response by age

	Ages 6-14	Ages 15-19	Ages 20-49
<i>Panel A: Wage work</i>			
Price/SD		-0.032*** (0.007)	-0.058*** (0.005)
Mean of dep. var		0.09	0.30
<i>Panel B: Agricultural work</i>			
Price/SD	-0.045*** (0.013)	-0.061*** (0.017)	-0.011*** (0.004)
Mean of dep. var	0.24	0.59	0.74
<i>Panel C: Housework</i>			
Price/SD	-0.000 (0.015)	0.002 (0.011)	0.035*** (0.007)
Mean of dep. var	0.53	0.70	0.68
N	2246	1733	6043
Province time trend	Yes	Yes	Yes
HH controls	Yes	Yes	Yes
Indiv. FE	Yes	Yes	Yes

Robustness

The results are robust to:

- adding quadratic province-specific time trends
- clustering at the level of the district
- including district-specific time trends
- alternate coffee price measures

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- Other time-varying effects correlated with fluctuations in coffee price?
- Use the remaining nine provinces of the survey as a “control” group

$$y_{jt} = \alpha + \beta p_{mt} + \gamma p_{mt} * CH + \delta_c t + \mu x_{it} + \eta_j + \epsilon_{jt}$$

- Identifying assumption: All co-varying trends affect households in the Central Highlands and elsewhere equally

Robustness: using all provinces

	Ages 6-14	Ages 15-19	Ages 20-49
<i>Panel A: Wage work</i>			
Price/SD*CH		-0.010 (0.007)	-0.019*** (0.006)
<i>Panel B: Agricultural work</i>			
Price/SD*CH	-0.033** (0.014)	-0.061*** (0.018)	-0.001 (0.004)
<i>Panel C: Housework</i>			
Price/SD*CH	0.015 (0.016)	0.001 (0.013)	0.049*** (0.009)
N	11,932	9,145	38,164
Province time trend	Yes	Yes	Yes
HH controls	Yes	Yes	Yes
Indiv. FE	Yes	Yes	Yes

Heterogeneity: Wage Work

	Ages 15-19	Ages 20-49
<i>Interaction var: Female</i>		
Price/SD	-0.031*** (0.009)	-0.040*** (0.007)
Female*Price/SD	-0.002 (0.011)	-0.036*** (0.011)
<i>Interaction var: Assets</i>		
Price/SD	-0.043*** (0.008)	-0.063*** (0.005)
Asset*Price/SD	0.024*** (0.006)	0.013*** (0.004)
<i>Interaction var: Nonkinh</i>		
Price/SD	-0.017*** (0.005)	-0.053*** (0.006)
Nonkinh*Price/SD	-0.035*** (0.012)	-0.012** (0.006)
N	1733	6043

Heterogeneity: Farm Work

	Ages 6-14	Ages 15-19	Ages 20-49
<i>Interaction var: Female</i>			
Price/SD	-0.051*** (0.017)	-0.066*** (0.019)	-0.009* (0.005)
Female*Price/SD	0.012 (0.015)	0.009 (0.016)	-0.004 (0.006)
<i>Interaction var: Assets</i>			
Price/SD	-0.045*** (0.013)	-0.053*** (0.015)	-0.008** (0.004)
Asset*Price/SD	-0.001 (0.008)	-0.018** (0.009)	-0.008*** (0.003)
<i>Interaction var: Nonkinh</i>			
Price/SD	-0.037** (0.015)	-0.063*** (0.023)	-0.012** (0.005)
Nonkinh*Price/SD	-0.015 (0.017)	0.004 (0.028)	0.003 (0.007)
N	2246	1733	6043

Heterogeneity: Housework

	Ages 6-14	Ages 15-19	Ages 20-49
<i>Interaction var: Female</i>			
Price/SD	-0.025 (0.017)	0.028* (0.015)	0.059*** (0.009)
Female*Price/SD	-0.012 (0.016)	-0.034** (0.015)	-0.037*** (0.011)
<i>Interaction var: Assets</i>			
Price/SD	-0.030** (0.015)	0.013 (0.011)	0.043*** (0.005)
Asset*Price/SD	-0.017* (0.009)	-0.003 (0.007)	-0.006* (0.004)
<i>Interaction var: Nonkinh</i>			
Price/SD	-0.040** (0.017)	0.027** (0.013)	0.039*** (0.005)
Nonkinh*Price/SD	0.016 (0.016)	-0.037* (0.022)	0.004 (0.007)
N	2246	1733	6043

Educational Outcomes

	Ages 7-14			Ages 15-19		
	Attending School	Grade	Overage	Attending School	Grade	Overage
Price/SD	-0.000 (0.006)	-0.049 (0.059)	0.005 (0.006)	-0.010 (0.013)	-0.076* (0.043)	0.019 (0.013)
Province time trend	Yes	Yes	Yes	Yes	Yes	Yes
HH controls	Yes	Yes	Yes	Yes	Yes	Yes
Indiv. FE	Yes	Yes	Yes	Yes	Yes	Yes
R-Square	0.024	0.36	0.055	0.22	0.39	0.18
N	1725	1725	1725	1367	1367	1367

Conclusion

- Drops in the coffee price results in decreased consumption, drawdown of assets and reallocation of labor to wage work
- Intra-household reallocation of labor:
 - Adults take up wage work, corresponding decrease in housework
 - Children and adolescents pick up slack on HH farm
- HH more likely to borrow when prices are low
- Policy: need for social protection program; improvement in financial infrastructure (credit, insurance)