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United States Department of Agriculture

Marginal Propensity to Consume Market Facilitation Program Payments

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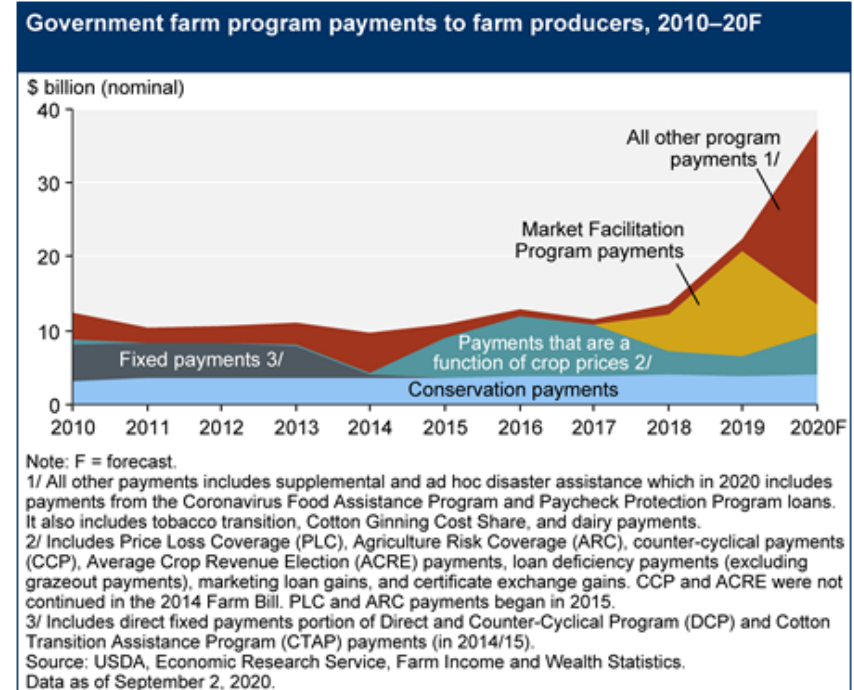
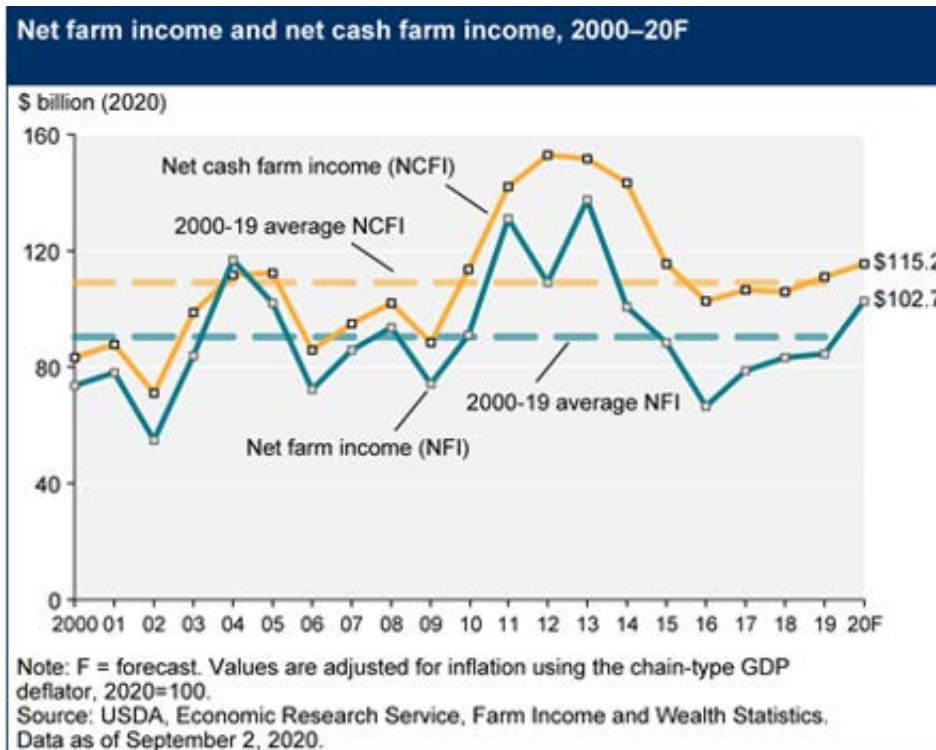
Farm Economy Disruption

- Trade disruptions
 - US exports \$26 bn in soybeans in 2017, >50% to China
 - 2018/2019 marketing year, soybean sales down 18%, exports to china down 53%
 - Gluts – Wisconsin cranberry exports to China down 45% in 2019, 25% crop discarded (NPR, 2019)



Rising Farm Incomes

- Despite disruption, farm incomes are rising largely due to increasing government payments



Research Question

- How effective are government payments at increasing the farm household's welfare?
- To answer, we estimate the marginal propensity to consume various income sources using ARMS pseudo-panels using data from 2013 - 2018



Antecedents

- Langemeier (1990) – uses a life-cycle income hypothesis model to estimate MPC of farm income of 2%
- Carriker et al. (1993) – expands the life-cycle model to incorporate income from different sources - farm income MPC of 2.6%, off-farm income 4.8%, government payments 5.2%
- Whitaker (2009) – adapts the Carriker model to use ARMS data - farm income 1%, off-farm income 10%, volatile subsidies 2% (insignificant), decoupled subsidies 24%



Empirical Model

If income is fungible, the life-cycle hypothesis becomes

$$C_t = \beta_0 + \beta_1(Y_{1t} + Y_{2t} + \dots + Y_{zt}) + \beta_2 C_{t-1} + \beta_3 W_t$$

If income is not fungible..

$$\lambda_1 C_t = \beta_{01} + \beta_{11} Y_{1t} + \beta_{21} \lambda_1 C_{t-1} + \beta_{31} W_t$$

$$\lambda_2 C_t = \beta_{02} + \beta_{12} Y_{2t} + \beta_{22} \lambda_2 C_{t-1} + \beta_{32} W_t$$

$$\vdots \quad \quad \quad \vdots \quad \quad \quad \vdots \quad \quad \quad \vdots \quad \quad \quad \vdots$$

$$\lambda_z C_t = \beta_{0z} + \beta_{1z} Y_{zt} + \beta_{2z} \lambda_z C_{t-1} + \beta_{3z} W_t$$

λ_s is the proportion of planned consumption from income source s summing across Z

$$\begin{aligned} C_t &= \sum_{s=1}^z \lambda_s C_t \\ &= \sum_{s=1}^z (\beta_{0s} + \beta_{1s} Y_{st} + \beta_{2s} \lambda_s C_{t-1} + \beta_{3s} W_t) \\ &= \beta_0^* + \sum_{s=1}^z \beta_{1s} Y_{st} + \beta_2^* C_{t-1} + \beta_3^* W_t \end{aligned} \quad \beta_0^* = \sum_{s=1}^z \beta_{0s}, \beta_2^* = \sum_{s=1}^z \beta_{2s} \lambda_s, \text{ and } \beta_3^* = \sum_{s=1}^z \beta_{3s}.$$



Empirical Model

Whitaker (2009) adapts the Carriker (1993) model for use with ARMS pseudo-panels

$$\bar{C}_{c(t),t} = \beta_{0c}^* + \sum_{s=1}^z (\beta_{1s}^* \bar{Y}_{sc(t),t}) \\ + \beta_2^* \bar{C}_{c(t-1),t-1} + \beta_3^* \bar{W}_{c(t),t} + \varepsilon_{c(t),t}$$

$c(t)$ is the cohort at time t , \bar{C} is mean consumption, \bar{Y}_s is mean income from source s
Cohorts are defined by the intersection of state and commodity specialization categories
Only include a cohort if it has 10 or more farm observations within it in a given year

Estimate the above equation with year fixed effects using five income sources;

- MFP payments

- Counter-cyclical payments

- Other government payments (Total gov payments minus the above)

- Net farm income (NFI minus the above)

- Off-farm income

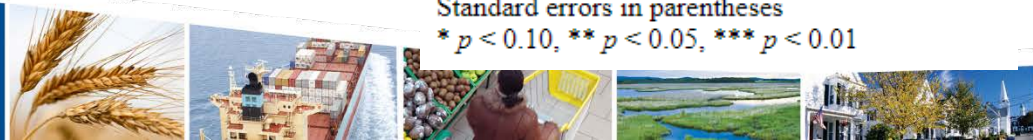


Results

- Net farm income has a smaller impact on consumption than in prior studies
- Off farm income has roughly half the MPC as in prior studies
- MFP payments are consumed at a marginal rate of about 10 percent
- MFP payments appear to impact consumption more than counter-cyclical

	All Farms	
	OLS	IV
farm income	0.0039** (0.0017)	0.0033 (0.0020)
off-farm income	0.021*** (0.0033)	0.019*** (0.0052)
MFP payments	0.17*** (0.024)	0.097*** (0.026)
counter-cyclical payments	0.17*** (0.014)	0.058*** (0.021)
other gov payments	0.067*** (0.023)	0.18*** (0.032)
household net worth	0.0022*** (0.00013)	0.0012*** (0.00014)
L.consumption	0.24*** (0.016)	0.64*** (0.045)
Observations	817	605
R ²	0.30	0.23

Standard errors in parentheses
 * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$



Results – Small vs Large Farms

- Off-farm income has a higher MPC for small farms
- MFP payments were consumed at a much higher marginal rate on small farms compared to large farms
- Counter-cyclical payments are also consumed at a higher rate on small farms compared to large farms
- Habit persistence parameter is higher for large farms

	Large Farms		Small Farms		
	OLS	IV	OLS	IV	
farm income	0.0030 (0.0020)	-0.0037 (0.0024)	farm income	-0.011 (0.0078)	-0.0024 (0.0098)
off-farm income	0.023*** (0.0045)	0.0012 (0.0058)	off-farm income	0.033*** (0.0024)	0.030*** (0.0037)
MFP payments	0.25*** (0.020)	0.18*** (0.028)	MFP payments	0.57*** (0.077)	0.63*** (0.087)
counter-cyclical payments	0.058*** (0.0099)	-0.0019 (0.0086)	counter-cyclical payments	0.16*** (0.040)	0.22*** (0.048)
other gov payments	0.13*** (0.032)	0.21*** (0.026)	other gov payments	-0.36*** (0.10)	-0.54*** (0.12)
household net worth	0.00038*** (0.00011)	0.00058 (0.0001)	household net worth	0.0025*** (0.00023)	0.00083** (0.00038)
L.consumption	0.43*** (0.050)	0.83*** (0.070)	L.consumption	0.26*** (0.015)	0.69*** (0.065)
Observations	398	284	Observations	641	477
R ²	0.38	0.31	R ²	0.28	0.12
Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$			Standard errors in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$		



2018 vs 2019 MFP Payments

- The 2018 MFP payments were consumed at a very high marginal rate by small farmers
- Ceteris paribus, farms who received MFP payments in 2019 consumed *less*
- *Possible explanations:*
 - *The 2018 MFP had payments which straddled the calendar year – farmers received the 2018 payment and had 50% value of production yet to be received in Q1 2019. Small farmers may have “pre-spent” the remaining 2018 MFP payments and “paid back” that spending in 2019 - (consumption expenditures vs consumption of durables).*
 - *The 2019 program was larger in scope and scale than the 2018 program. Small farmers received roughly equal average payments in 2018 and 2019. Expecting higher payments, this caused them to have lower consumer confidence than large farms – causing the more negative MPC.*



Conclusions

- 2018 MFP payments were effective at increasing farm household consumption spending and therefore welfare
- 2018 MFP payments directed at small farms were consumed at a much higher rate than those given to large farms
- Farm household consumption spending is less affected by farm and off-farm income variation now than in prior time periods covered by other studies



Q&A

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