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AJAE appendix for  
*Is There Persistence in the Impact of Emergency Food Aid?*  
*Evidence on Consumption, Food Security and Assets in Rural Ethiopia*

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## Technical Appendix

This appendix addresses whether it is better to estimate the impact of each food aid program (EGS or FFD) with or without the recipients of the other program in the sample. Including beneficiaries of the other program could contaminate impact estimates. For example, impact estimates would be biased downward if the potential comparison group is more likely to receive the other program. Alternatively, removing all beneficiaries of the other program from both the treatment and comparison groups can also lead to bias. In general, dropping treatment or comparison households from concentrated portions of the outcome distribution will also create biased estimates of mean outcomes. Also, shrinkage of the potential comparison group may cause many treatment households to be dropped from the analysis due to lack of a suitable matched comparison households. Such treatment households are said to lack “common support”. Heckman, Ichimura and Todd (1997) note that dropping a large number of treatment observations due to lack of common support leads to biased estimates of the average impact of the program.

We tried several approaches to dealing with this problem and investigating which source of bias was greater. First, for each program, we tried including an indicator for whether the household received the *other* program as a control variable in the propensity score matching and found that adding this control did not change the results. Also, for EGS, we argue that FFD transfers are unlikely to create an upward bias in estimates of EGS impact because kernel-weighted average FFD transfers to the comparison group of non-EGS participants are nearly double the FFD transfers received by EGS participant households in the matched sample (p-value on equality of FFD transfers is 0.024).

Next, we estimated the impact of each program excluding households that received the other program from both the treatment and comparison groups. Because 40 percent of households in villages with food aid received both EGS and FFD, this substantially reduced the size of both the treatment and comparison groups, making it difficult to find matches with common support. For the EGS propensity score matching model, dropping households that did not received the FFD program greatly reduced the sample, from 704 to 276 households. The share of households participating in the EGS fell from 63.4 in the full sample to 59.4 in the sample without FFD participants. Using this restricted sample, the estimated impact of the program on growth in consumption and food consumption fell sharply, to 0.068 and 0.176, respectively, and neither impact estimate was significant (columns 1 and 2 of Table A.1). The smaller impacts in the restricted sample arose from somewhat smaller growth in consumption for EGS participants than in the full sample, but more so from considerably higher consumption growth for households not in the EGS. This pattern is presented in greater detail in Figure A.1. The figure compares the kernel density of the change in log consumption from 1999-2004 for EGS participants and non-participants in the matched full sample to those from the matched restricted sample without FFD recipients.<sup>1</sup> The distribution of consumption growth is similar for EGS participants in the two samples, but non-participants have very different distributions with a much fatter lower tail in the full sample than the restricted sample. Again, concerns that FFD transfers may go disproportionately to EGS participants and lead to overestimates of EGS impact appear to be unfounded given that the EGS distribution is fairly robust to removing households that also receive the FFD. However, the differences in distributions for the comparison group

suggest that the restricted, non-FFD sample will not provide reliable estimates of the average impact of the EGS program. In particular, restricting FFD recipients from the sample creates a new form of bias by eliminating many of the poorest households from the comparison group. Keeping FFD recipients in the sample appears unlikely to create substantial bias in the impact estimates for the EGS, while removing them may introduce significant new sources of bias.

We also explored potential bias in the FFD impact estimates from inclusion of EGS participants in the matched sample. In t-tests, we could not reject the hypothesis that kernel-weighted average EGS transfers were the same size between FFD recipients and non-recipients in the matched sample ( $p\text{-value}=0.985$ ), so EGS transfers are unlikely to contribute to over- or under-estimates of FFD program impacts. We also tested whether the impact estimates were robust to removing EGS participants from the matched sample. Dropping all EGS participants from the list of FFD recipients and the comparison group reduced the sample for the FFD model from 718 to 263 households. Based on this restricted sample, consumption growth for FFD recipients was nearly identical to that of matched non-recipients over the period (column 3 of Table A.1). Food consumption growth was much higher for FFD recipients and non-recipients in the sample with EGS participants removed than in the full sample, but the difference-in-difference impact estimate is 0.145 and is insignificant (column 4 of Table A.1). This estimate is considerably smaller than the estimate of 0.251 on the full sample. Figure A.2 shows how the distribution of the difference in log consumption changes for FFD recipients and matched non-recipients when EGS participants are removed from the sample. These changes to the distribution, particularly the shift to the right in this

distribution for FFD recipients when EGS recipients are removed, suggest that the presence of the EGS is not determining the impact estimates in the full sample. We conclude that the impact estimates from the full sample are more reliable.

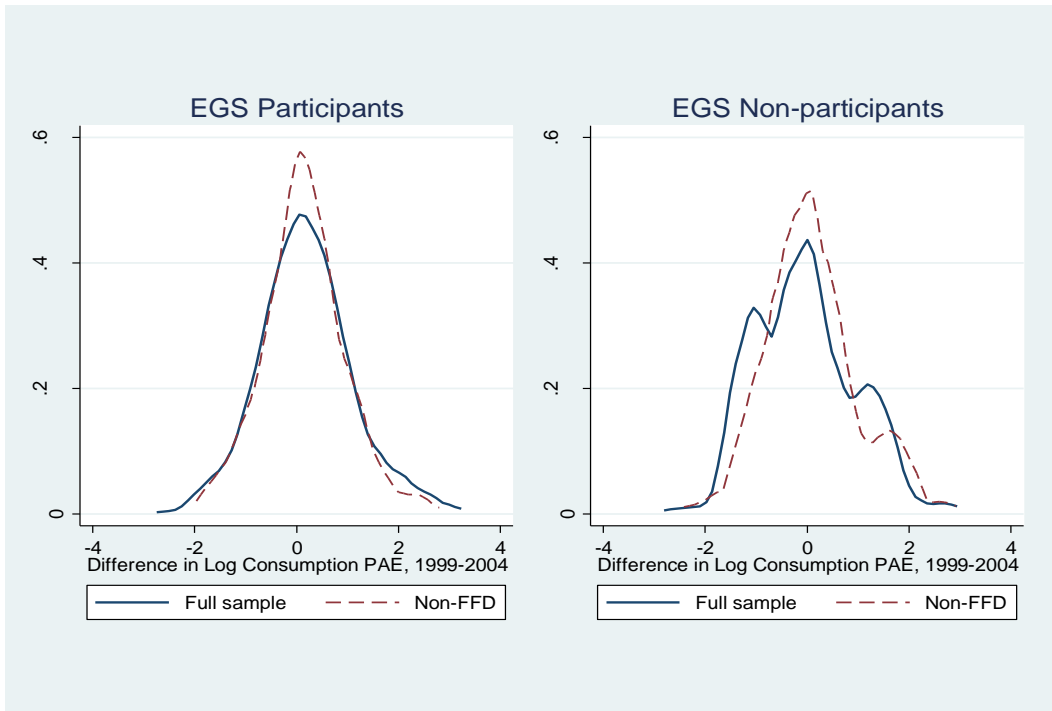
**Table A.1: Difference-in-Difference Estimates of the Impact of Participation in EGS and FFD, Restricting Recipients of the Other Program from the Sample**

Outcome Variable <sup>2</sup> :	For EGS:		For FFD:	
	Consumption,		Consumption,	
	without FFD		without EGS	
	Total	Food	Total	Food
<i>Mean Impact:</i>				
Average outcome, participants	0.153	0.234	0.185	0.409
Average outcome, non-participants	0.085	0.059	0.182	0.264
Difference in average outcomes, ATT	0.068	0.176	0.003	0.145
	(0.362)	(0.817)	(0.013)	(0.580)

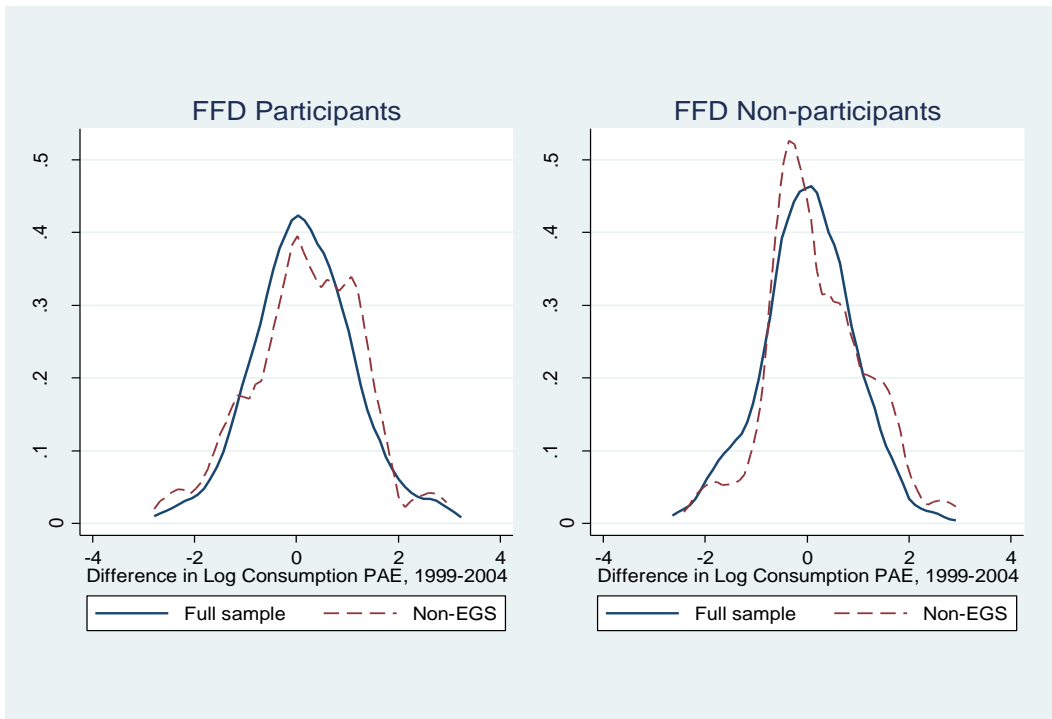
Note: Absolute value of t statistics on ATT in parenthesis. These are based on bootstrapped standard errors using 1000 replications of the sample.

a. Outcome variables for consumption are change in monthly log real total consumption per adult equivalent, 1999-2004, and change in monthly log real food consumption per adult equivalent, 1999-2004.

b. \* significant at the 10% level; \*\* significant at the 5% level; \*\*\* significant at the 1% level.



**Figure A.1: Changes in the Kernel-Weighted Distribution of Consumption Growth when FFD Recipients are Excluded from the Sample**



**Figure A.2: Changes in the Kernel-Weighted Distribution of Consumption Growth when EGS Recipients are Excluded from the Sample**



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<sup>1</sup> Observations are weighted using weights given to matched observations in the matching algorithm run on the two samples.