Learning about labor impacts of African Cash Transfers through a Continuous Treatment Approach: the case of Zambia

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Agenda

- [Background]

- Motivation and previous results

- The CGP in Zambia

- Empirical strategy

- Results
  - [Policy implications]

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Background

- **Social protection** has become a prominent part of the development agenda over the last decades as well as an important component of food security and poverty reduction

- **FAO** plays key role in advising governments in the policy-making process to advance social protection

- Current study is part of a series of papers and reports of the **PtoP (From Protection to Production) team** aimed at building an evidence base to inform policy decisions on Social Protection in **sub-Saharan Africa**

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Motivation and previous results

Policy interest:

- Growing relevance of **UCTs as a Social Protection tool** for protecting lives & livelihoods

- UCTs in Africa increased ten-fold between 2000 - 2012, **spread in 41 countries**

- UCTs aim primarily at **reducing poverty** by improving nutrition and human capital

- Governments also interested in **productive impacts** or the lack thereof

- UCTs can help HHs boost market participation and productive activities.

- On the downside, increasing concerns among policy-makers of the possible incidence of UCT on **work incentives** and **dependency**

Motivation and previous results

- Economic theory suggests several ways of how **unconditional CTs** might affect adult **labor supply** in recipient households

- **Income effect** of UCTs - increase in non-labor income

- UCTs offer a leg up to **ease labor market imperfections**

- UCTs may help rural HHs **overcome credit market failures**
  - meet investment needs and have increased access to productive assets.

- Improved **human capital** of children (access to health, education)

- The interplay of these channels makes this an empirical issue

Motivation and previous results

Previous findings:

- Debate in **developed economies** about the labor supply effects of an increase in unearned income due to handouts introduced by **Negative Income Tax** programs

- Empirical studies on the effects of transfer payments on labor supply in developed countries **widely document disincentives** among recipient HHs (Moffit 1979, 2005; Blundell and Hoyness 2004)

- In **Latin America**, conditional CTs do not appear to have much impact on work incentives and adult labour supply. (Brazil: Ribas and Soares, 2011; Mexico: Skoufias et al., 2008; Nicaragua: Maluccio and Flores, 2005)

- Some evidence shows that CCTs may modestly reduce the time spent working, for males in Nicaragua (Maluccio and Flores, 2005) and females in Brazil (Teixeira, 2010)

Motivation and previous results

Previous findings: Africa

- Studies focusing on labor outcomes of CTs in sub-Saharan Africa **do not show consistent evidence** in this regard

- Daidone et al. (2014) analyzed **productive impacts of the Zambia CGP** and found increased productive activities and investment, accumulation of productive assets and a shift from agricultural wage labor to own farm labor

- Asfaw et al. (2014) look into **Kenya's CT-OVC**. Similar pattern emerges in terms of labor reallocation, with relevant age and gender differences

- Gilligan et al. (2009) show no disincentive effects on labor supply looking at **Ethiopia's Productive Safety Net Programme (PSNP),** while Ardington et al. (2009) find positive impacts on adult labor supply for South African Old Age Pension.

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The CGP program in Zambia

- **Child Grant Program** (2010): alleviating poverty among the poorest and block its intergenerational transmission

- **Pilot evaluation** implemented in 3 districts with highest rates of mortality and morbidity among children under 5

- Categorical **targeting mechanism**, reaching any household with a child under 5

- Impact evaluation designed as a **longitudinal RCT** with two levels of random selection of participants, at the Community (CWAC) and household level

- Beneficiary households received **60 ZMK a month**, which is equivalent to 21 international dollars 25 % of a HHs monthly consumption expenditure

- **Transfer size supposed to be flat** regardless of HH size but some variability in the amount of cash received during 12 months through follow-up survey

The CGP data: continuous treatment

- μ ≈ 640 ZMK
- σ ≈ 170 ZMK
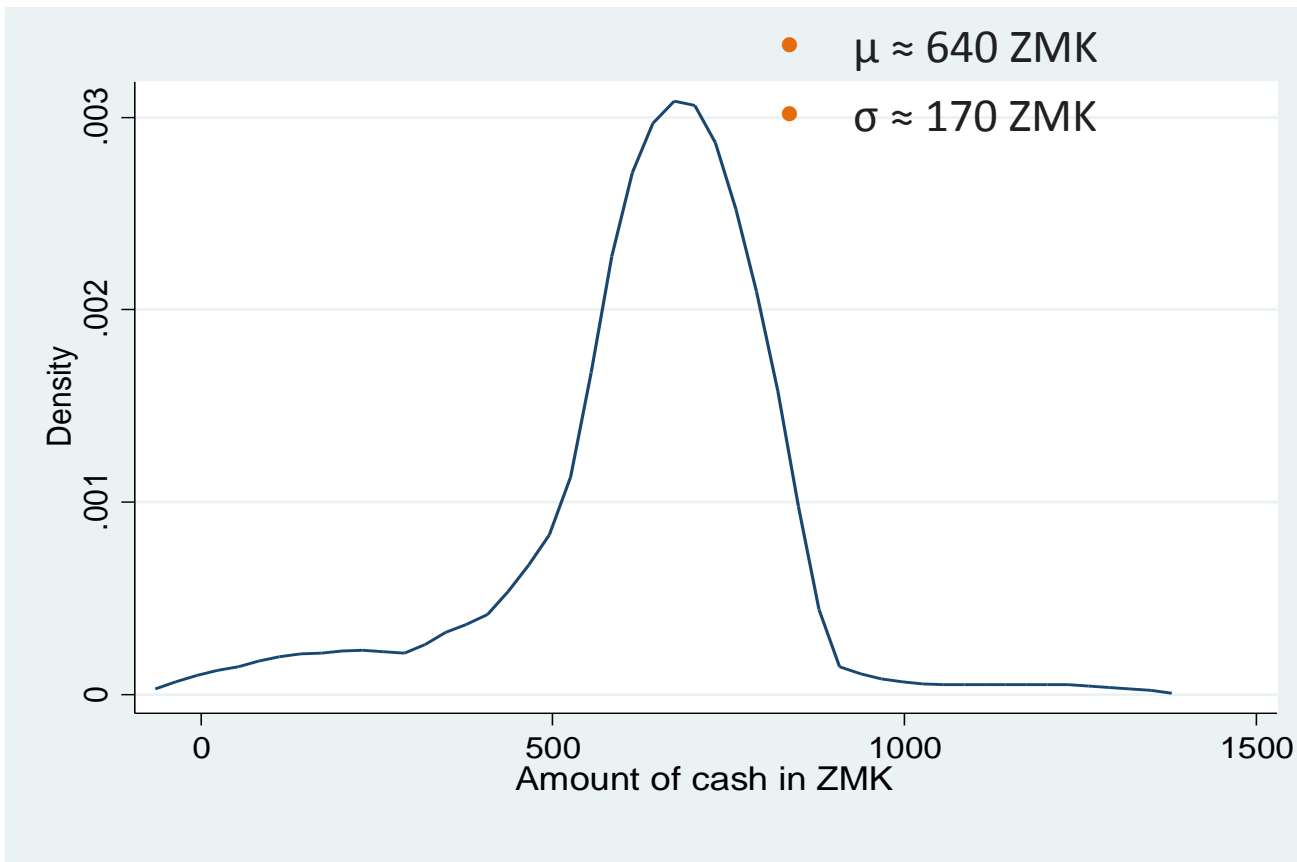
Average yearly amount of self-reported transfer

The CGP data: outcomes

Any wage labor

Own farm labor
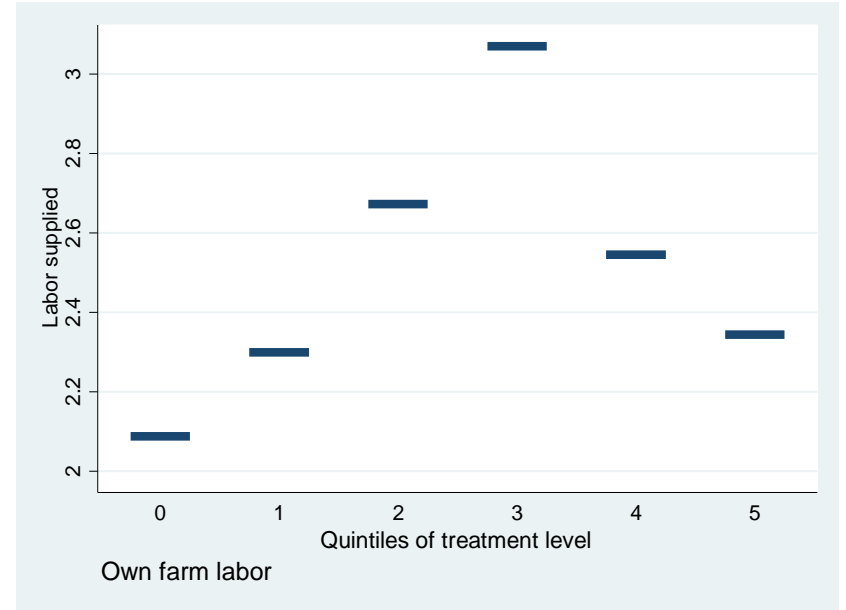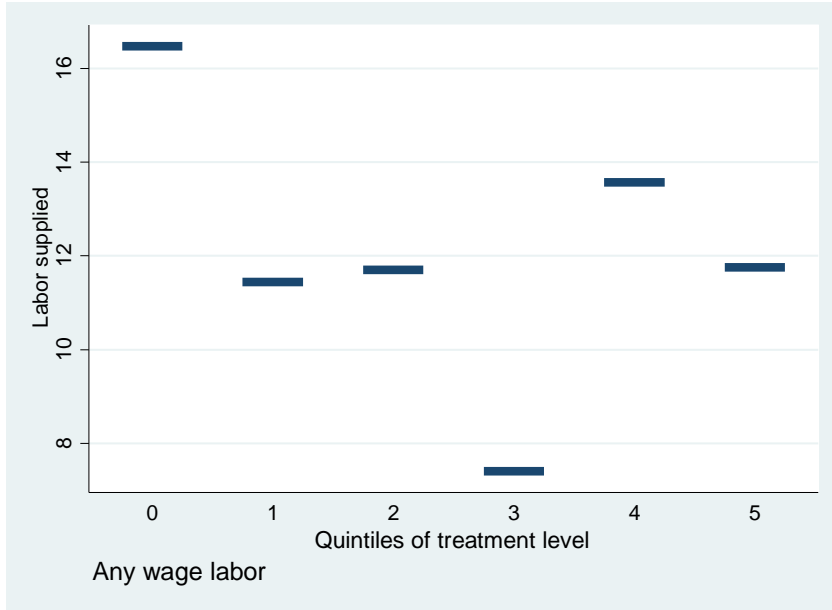
Total number of days per week worked by all adult HH
members in the last rainy season

The CGP data: success of the binary randomization

|	Original sample		
	Controls	Treated	Diff
HH members under 5y	1.905	1.881	0.003
HH members 6-12y	1.283	1.254	0.009
HH members 13-17y	0.438	0.494	-0.062*
Male HH members 18-64y	0.89	0.917	-0.051
Female HH members 18-64y	1.138	1.158	-0.02
Male HH members over 64y	0.017	0.018	0
HH size	5.69	5.746	-0.124
Number of orphans	0.311	0.297	0.017
Age of HH head	29.54	29.57	-0.349
Education of HH head	3.99	4.341	-0.318*
Dependency ratio	2.39	2.385	0.038
Price of maize	10.65	11.34	-0.621***
Price at potatoes	0.766	0.767	0.025
Number of cattle	0.363	0.593	-0.148
Number of poultry	2.053	2.144	-0.064
Operated land (ha)	0.479	0.522	-0.03
Female headed HH	0.996	0.994	0.005
Widowed HH head	0.055	0.052	0
Elderly HH head	0.007	0.005	0.001

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Empirical strategy

- Potential outcome framework
  - Treatment $t_i \in J$; $D_j(t_i)=1$ if $t_i=j$ and 0 otherwise
  - Infinity of potential outcomes $Y_i(j)$

- Parameter of interest
  - $\text{ATT}(t)=E[Y_i(j) - Y_i(j)|t{=}j]$

- Identifying assumption - CMIA
  - $E[Y_i(j)|X_i] = E[Y_i|D_j(t_i) = 1, X_i]=E[Y_i|t_i = j, X_i]$
  $$\Rightarrow E[Y_i(j)] = E[E[Y_i(j)|X_i]$$

- Estimating equation $-$ Linearity
  - $Y_i = \delta_0 X_i + (\delta \bar{X} + \bar{h})w + \delta(X_i - \bar{X})w_i + \left(h(t_i) - \bar{h}\right)w_i + \varepsilon_i$

- Estimates
  - $\boldsymbol{\beta}_{\text{OLS}}=(\boldsymbol{XX})^{-1}\boldsymbol{X'y}$

Empirical strategy

- HHs not randomly assigned to the different levels $t \in J$
  - ⇒ assume CMIA .. but not clear how to gauge its validity

- **Doubly robust (DR)** estimators may mitigate selection bias from non-random treatment assignment

- DR requires an **outcome model** and a model relating the probability of treatment t to X, i.e. the **GPS**: $P(t|X)$

- Weighted estimation of the outcome equation with stabilized weights $S\omega = \dfrac{P(t)}{P(t|X)}$
  - $\boldsymbol{\beta}_{WLS} = (X\Delta X)^{-1}X'\Delta y$ where $\text{diag } \Delta = \{S\omega_i\}$

- In DR models the **coefficient estimates in the outcome model are consistent** if either model is correctly specified in terms of the functional form and relevance of the included covariates

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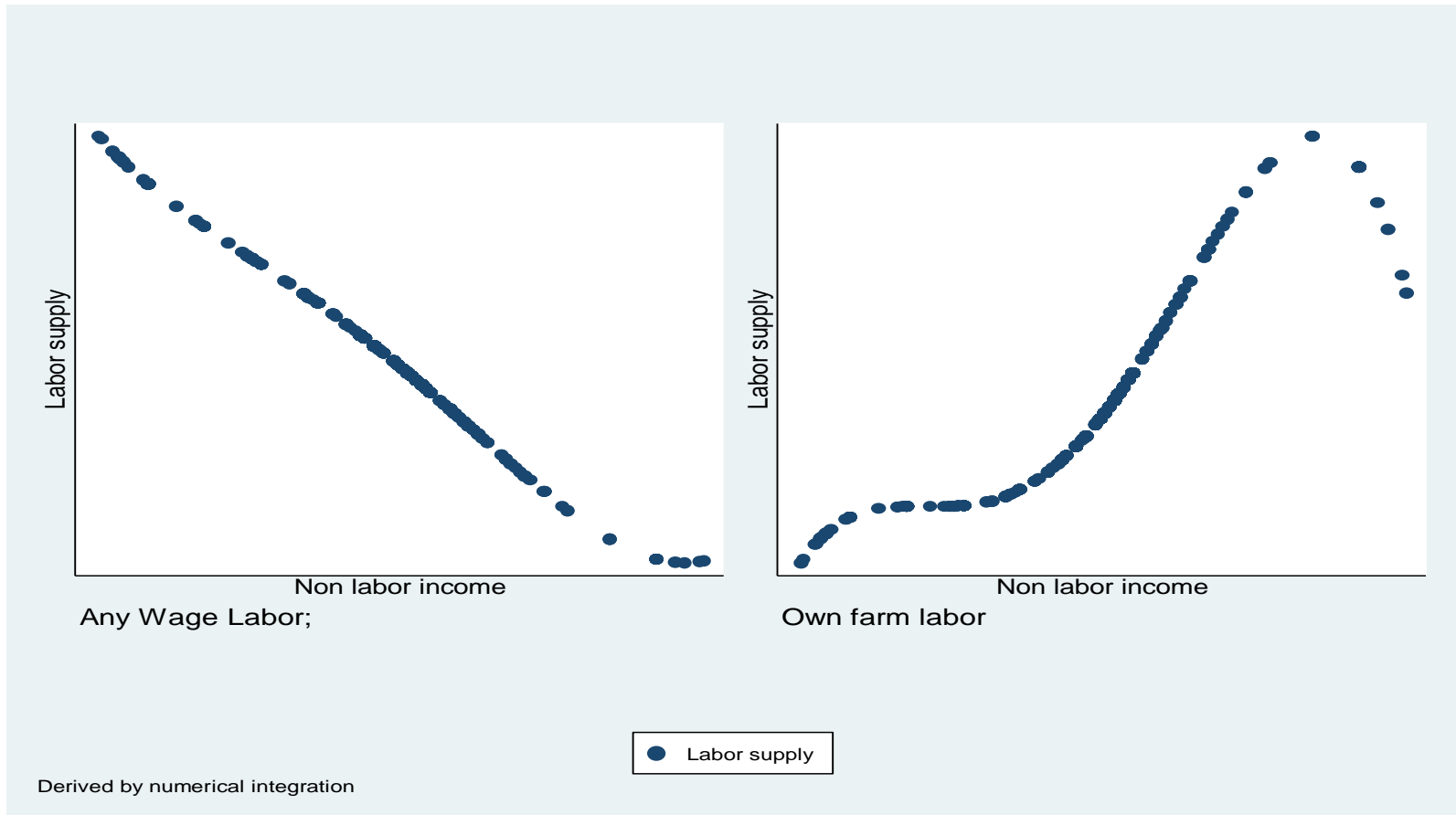- Empirical strategy

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Results – whole sample

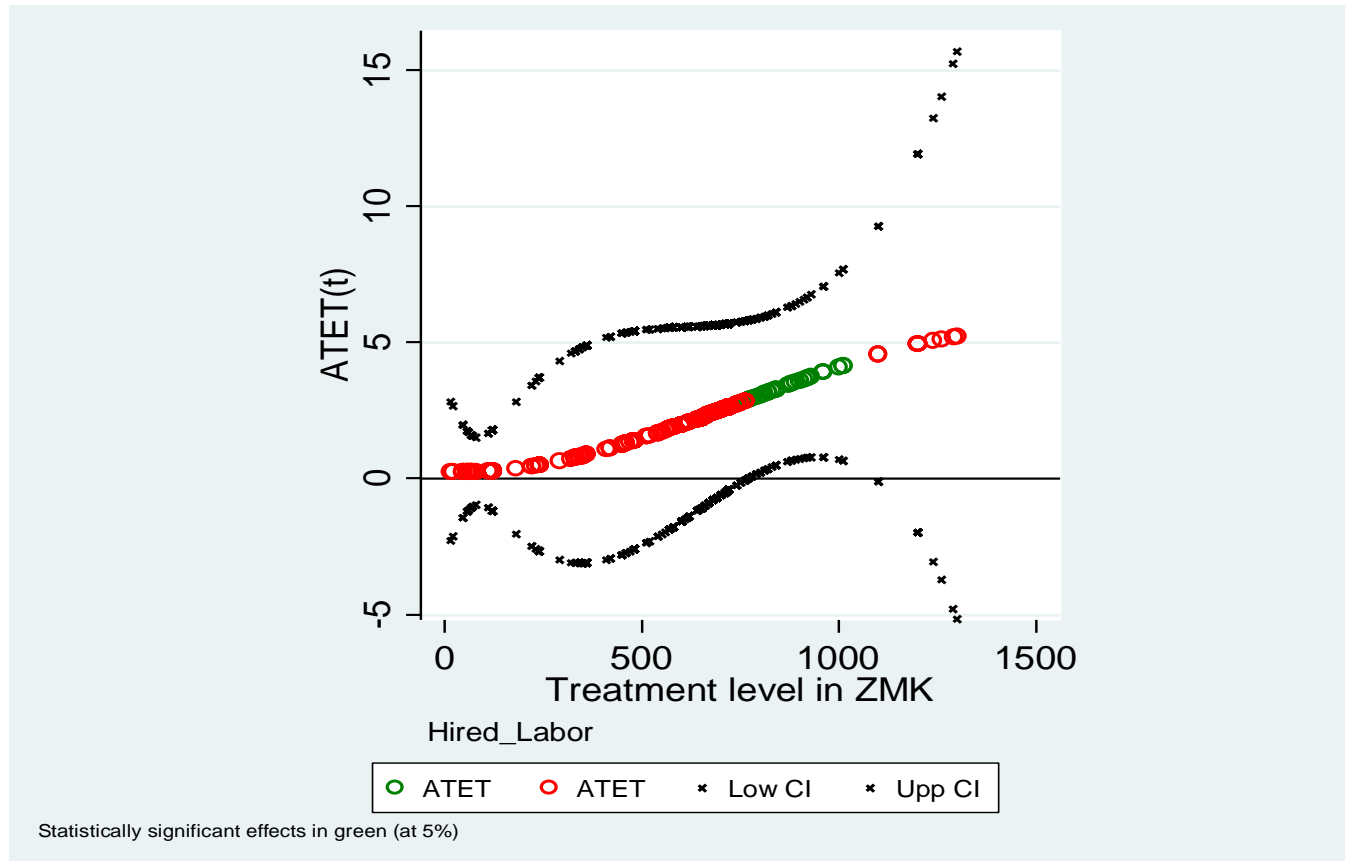Response of labor supplied by HHs to changes in non-labor income

Statistically significant effects in green (at 5%)
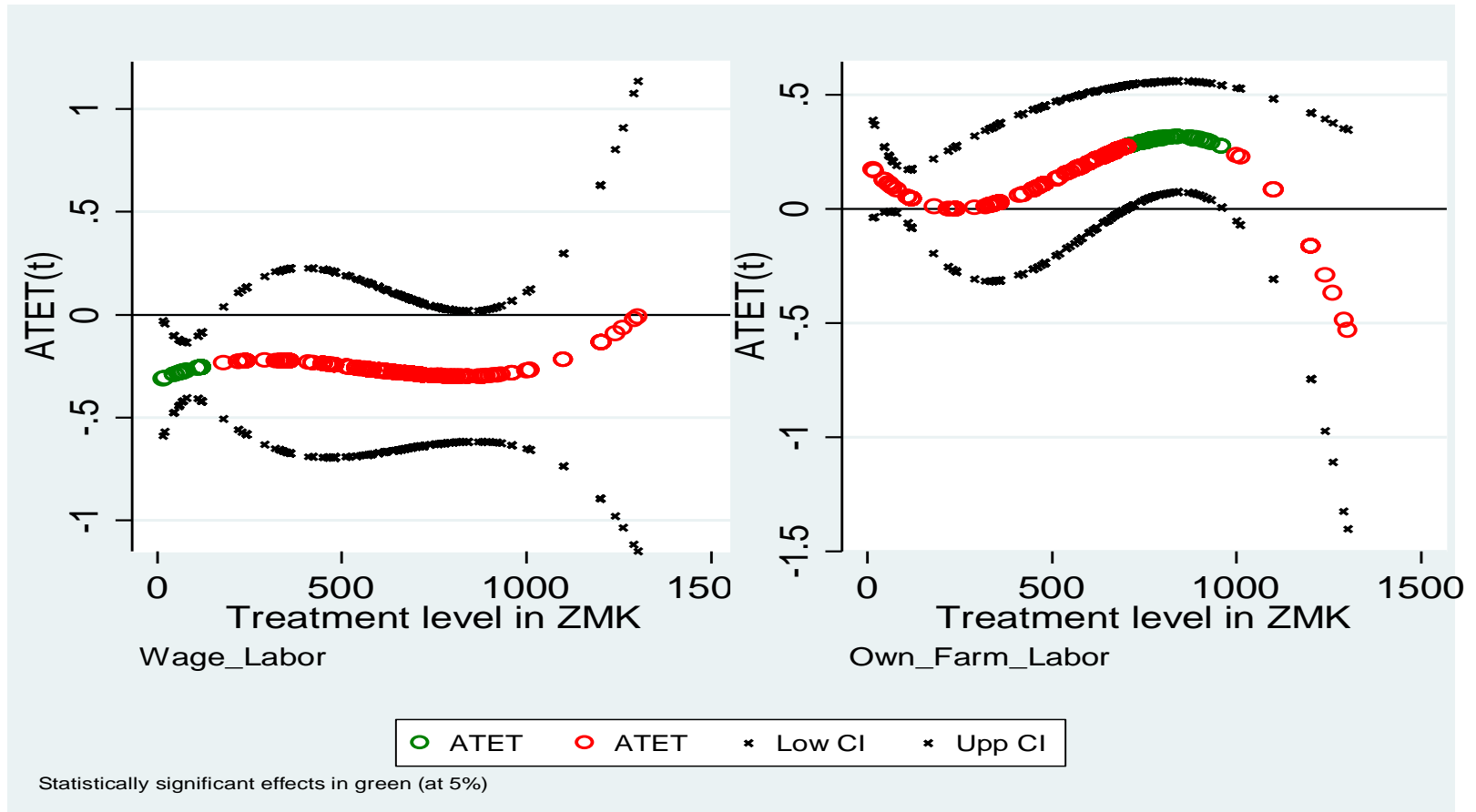
Results - whole sample

Relationship between supplied labor and non-labor income

Any Wage Labor;

Own farm labor

Labor supply

Derived by numerical integration

Results - whole sample

Response of hired labor to changes in non-labor income

Statistically significant effects in green (at 5%)

Results – sub samples

Average treatment effects by treatment level and subsample of dependency ratio

Statistically significant effects in green
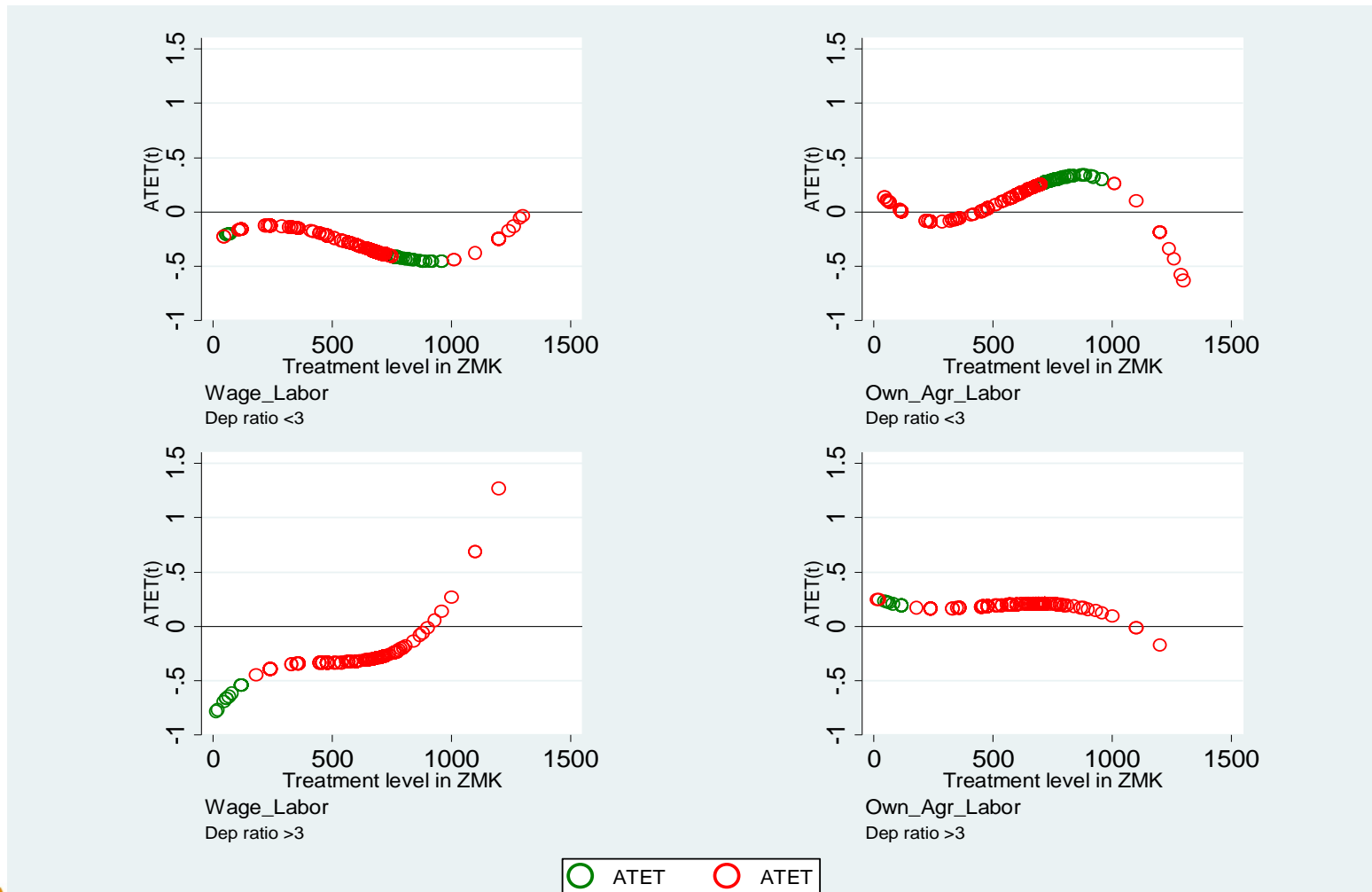
Results – sub samples

Effects on hired labor by treatment level and subsample of dependency ratio
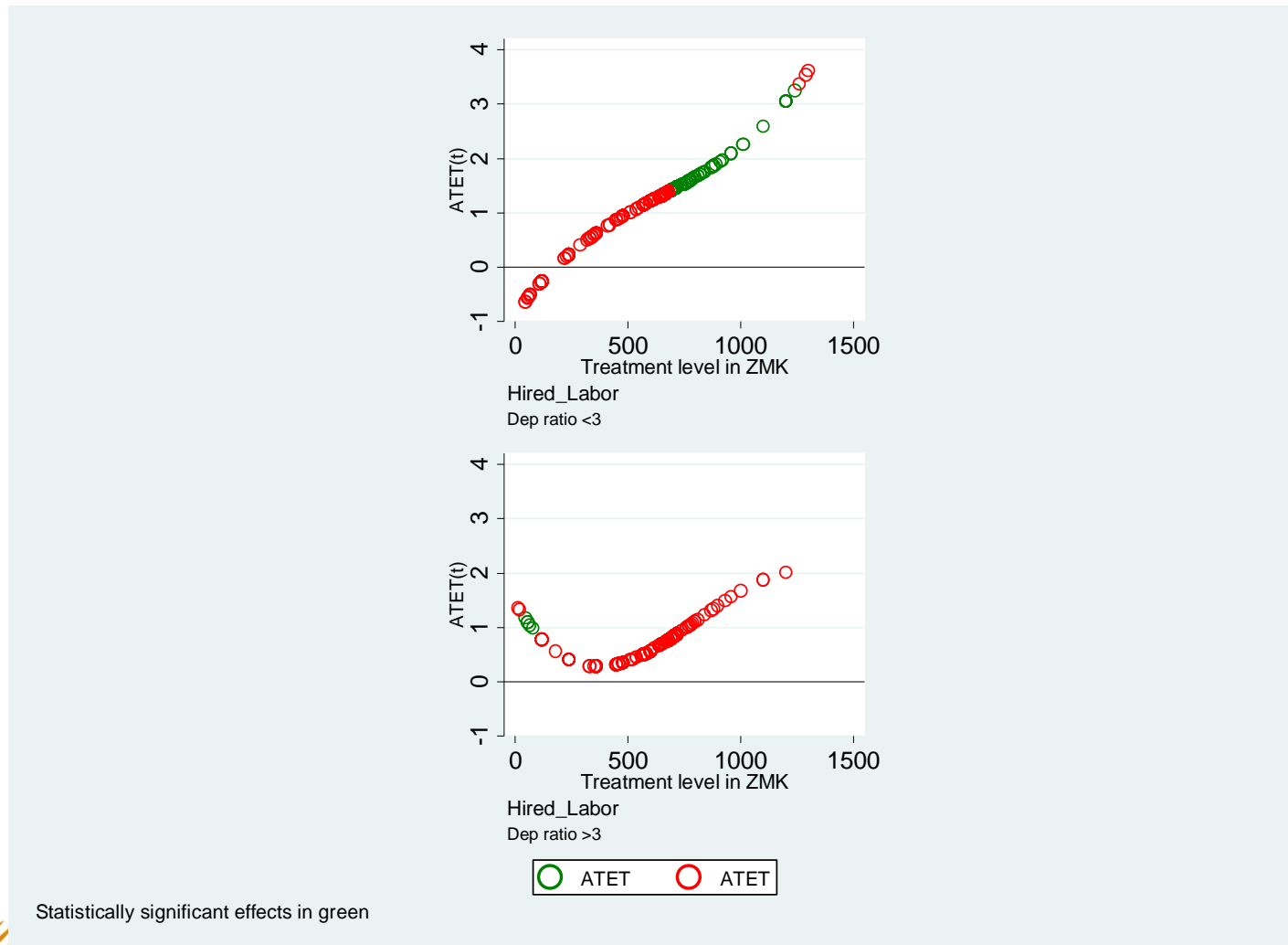
Statistically significant effects in green

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Results

- We find that the CGP led to a reduction in the supply of beneficiary household labor to off-farm paid work regardless of the level of CT received by the household, though the effect is significant for relatively lower levels of the transfer

- On the other hand, the CGP led to a increase in the labor supply to own farm labor activities, though significant only at relatively higher levels of transfers

- The effect of the CGP on own farm labor becomes negative only above 1250 ZMK. Possible existence of an optimal transfer level (in terms of labor incentives) greater than the average amount currently received by HHs

- Possible disincentive effects are well beyond the current transfer level (over 50 percent greater than the theoretical maximum)

Results

- Significant differences between labor constrained and non labor constrained households.

- The impact of the CGP on off farm wage labor and own farm labor is significant at lower levels of transfer for the labor constrained households

- Impact is significant at higher levels of transfers for non labor constrained households.

- Thus the heterogeneous analysis suggests that in fact it is the same households that are switching from off farm wage labor to on farm activities.

- Our findings substantially confirm the results obtained by Daidone et al. (2014), who have found a shift from agricultural wage labor to own farm labor in the evaluation of productive impacts of the Zambia CGP

- Similar effect is found on agricultural labor hired in by beneficiary HHs

Model diagnostics

- When **GPS is correctly specified** weighting by Sw creates a pseudo population in which X no longer predicts t i.e.

    - $X \perp 1[t=j] \mid P(t|X)$ (balancing property of the GPS).

    - Accessing whether **the balancing property** is verified in the data is a fundamental diagnostic check for the functional form of the GPS

    - The balancing property allows also to informally gauge the validity of the identifying assumption of the outcome model, namely of the CMIA

- In the context of continuous treatment there are few statistical procedures that can be applied to assess the validity of the balancing property

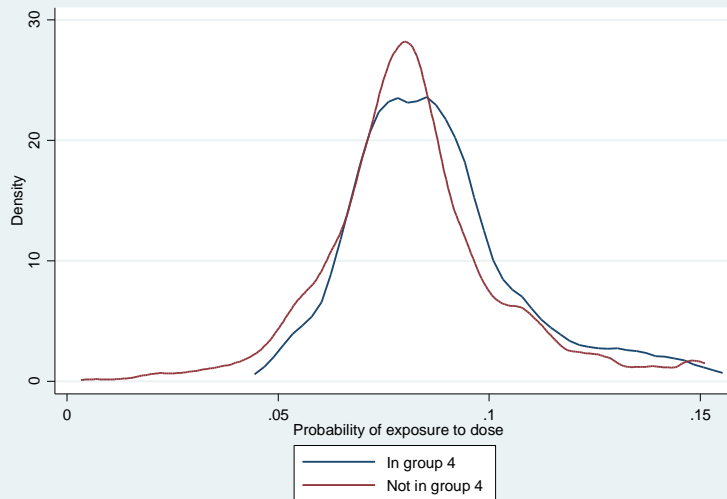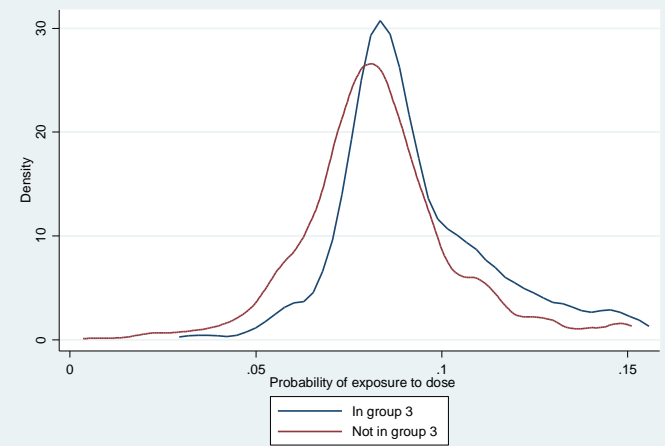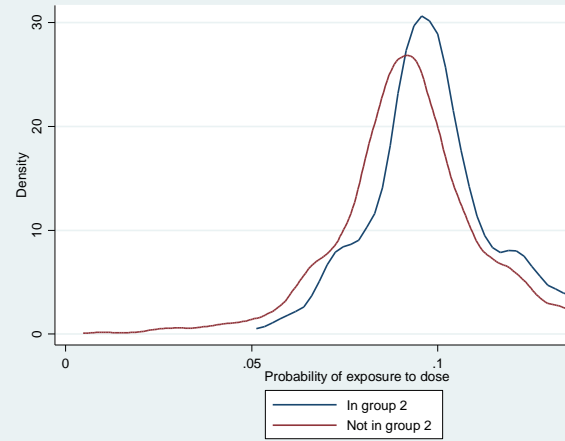# Model diagnostics

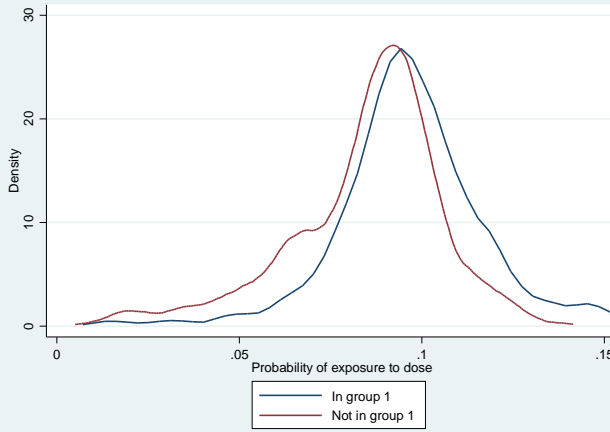Standard normal quantile plots

No GPS

With GPS
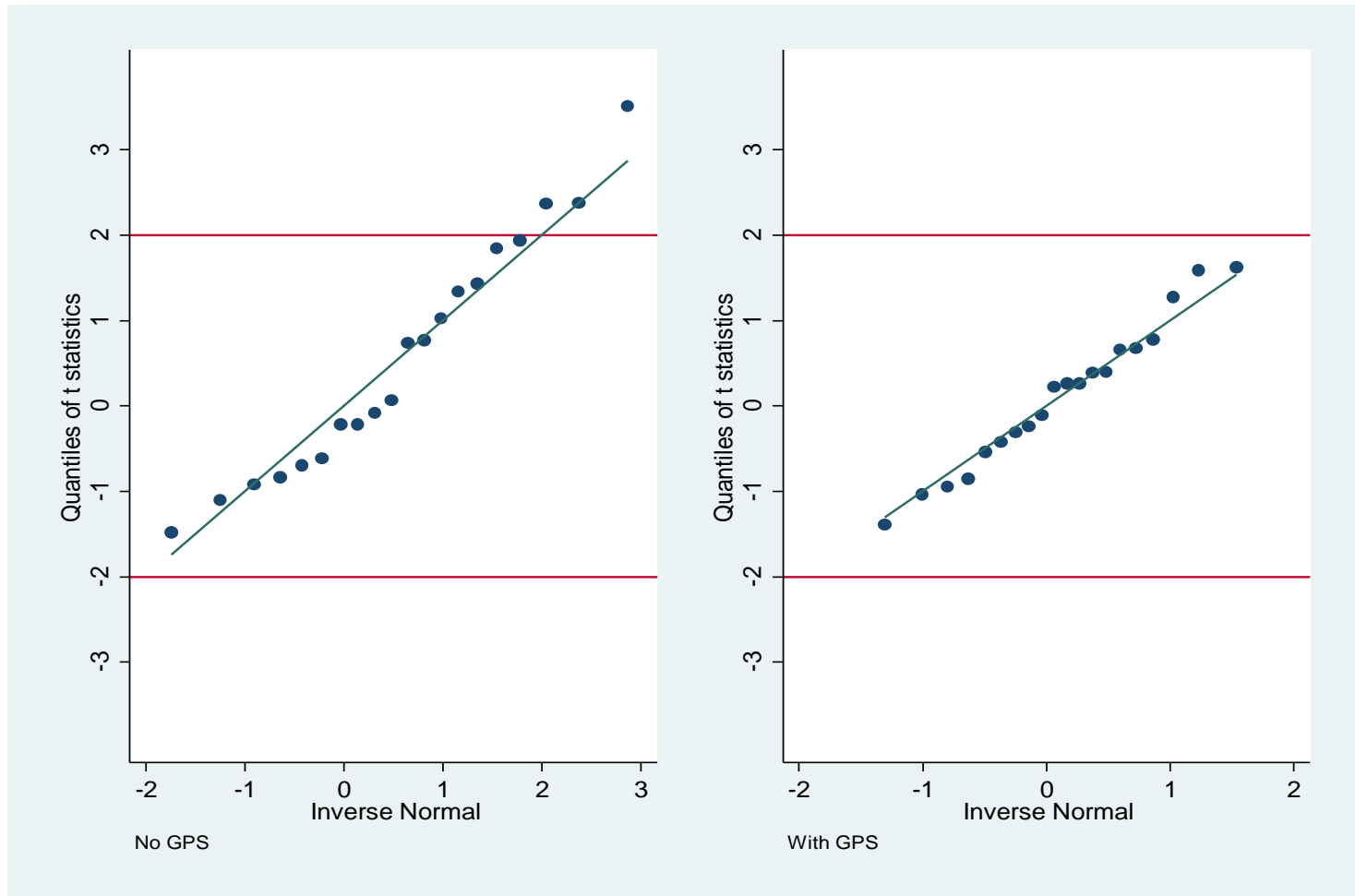
Model diagnostics

Pairwise correlations
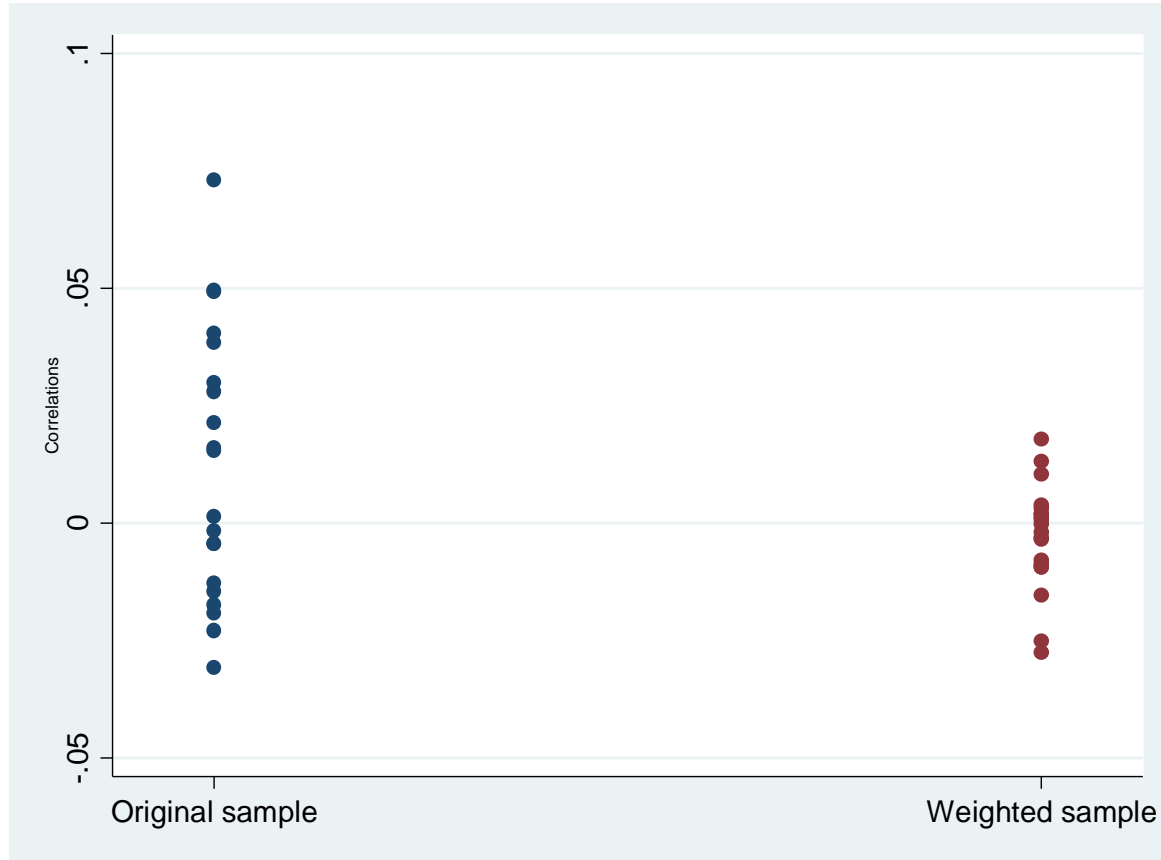
Model diagnostics

Common support check for the GPS

Thank You