Extended Abstract

Paper/Poster Title	**Agricultural policy and family farms' commercialisation. Insights from Brazil**

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Abstract	***200 words max***

Since the beginning of the 1990s, Brazil has introduced different policies to increase agricultural production of family farms, such as the National Program for Strengthening Family Farming (Pronaf), the technical assistance and rural extension programs (ATER), and seeds distribution. Despite the key role of these policies for the development of Brazilian family farms, there is a lack of empirical studies quantitatively investigating their impact on commercialisation of farm products. To fill this gap, we apply propensity score matching techniques to household-level data from the Brazilian National Household Sample Survey of 2014, the only year when information about participation in the programs has been detected. We compare the commercialisation behaviour of policy recipients and non-recipients, accounting for interaction effects between different policies, and test the robustness of our results to unobserved variables. We find that Pronaf has a significant positive impact on family farmers' propensity to engage in commercialisation, and this effect increases if the farmers also have access to technical assistance or seeds. Technical assistance bears a positive effect, while seed distribution alone does not make a significant difference. To promote the commercialisation of family farms, a well-balanced policy mix is thus needed.

Keywords	family farms; agricultural support policy; policy mix; commercialisation; propensity score matching
JEL Code	**Q12** Micro Analysis of Farm Firms, Farm Households, and Farm Input Markets; **Q18** Agricultural Policy; Food Policy

Introduction	***100 – 250 words***

Family farms have been recognised as key actors for promoting rural development and environmental sustainability, reducing hunger, and achieving the Sustainable Development Goals. Accordingly, developing and emerging countries have implemented a range of policies to support them. Brazil is one of them, as food security has become an important socio-political issue in the country. Among other policies, Brazilian family farms have benefited from the National Program for Strengthening Family Farming (Pronaf), which provides credit at favourable conditions; Federal and State policies for technical assistance and rural extension (ATER); and Federal and State policies for accessing seeds distribution (Seeds). The impact of these policies has been extensively investigated in the literature. However, results are ambiguous, particularly on their effects on family farms' decision whether to commercialise their production. The studies about Pronaf provide diverging results, while there is a lack of quantitative analysis on the impact of ATER and the Seeds policies. Furthermore, to the best of our knowledge, no empirical work has quantitatively investigated their

combined effect, despite the important and non-trivial synergies generated by policy mixes. Given the multidimensional benefits of family farming for rural development, it is important to assess the combined effects of agri-food policies on their decisions to prevent negative side effects. To contribute to filling this gap, we apply matching strategies to a national dataset of Brazilian households, from which we extract family farms. We assess the impact on commercialisation of participation in the three above policies, controlling for policy-mix effects.

Methodology	***100 – 250 words***

We use data from the 2014 National Household Sample Survey of the Brazilian Institute of Geography and Statistics. This dataset contains information about households' participation in different policies, and on whether they have engaged in commercialisation of farm production. To build our sample, we filter the households according to the official definition of "family farm", which also ensures that they are eligible for policy support. Given the endogeneity issue, to assess the impact of the policies on farm commercialisation we apply propensity score matching (PSM). Our outcome variable is commercialisation (binary), and the farms are matched using socio-economic and farm characteristics identified as relevant in the literature. Given that family farms can participate in more than one policy, we follow the approach proposed by Guerzoni and Raiteri (2015)[1] to tackle the confounding effects arising from policy interactions. This approach is well-suited for a cross-sectional dataset like ours. Furthermore, to reduce the number of treatments and thus sample fragmentation, we exclude the farms which received support from the private sector. This results in a sample of 4,170 family farms, of which 809 "treated", and 10 treatments: each of the three policies regardless of others (3), only one policy (3), two policies (3), and all the policies (1). Since PSM does not control for unobserved differences between treated and untreated farms, we test the robustness of our findings by checking how strongly an unmeasured variable must influence the selection for undermining the results of matching, using the approach by Rosenbaum (2002).[2]

Results	***100 – 250 words***

The farming households benefitting from Pronaf are smaller, more highly educated, often white, often from the South, have more often access to internet and to a means of transport, and earn higher farm incomes. Those receiving seeds are more likely to be led by non-white farmers or women, have the lowest incomes, and are often from the Northeast. Before matching, all policies and policy mixes generate a positive and statistically significant impact on the share of farms commercialising their production, the only exception being seeds distribution, which does not yield any significant effect. Pronaf and ATER jointly have the largest impact (16.1%), followed by Pronaf alone (15.7%). The average treatment effects on the treated (ATT) calculated after matching are slightly smaller, but still significant in most cases: 8.1-14.6% (depending on the matching algorithm) for Pronaf, and 9.3-10.3% for technical assistance, while the impact of Seeds remains non-significant. When policy interactions are taken into accounts, the largest significant impact is generated by Pronaf and seeds (19.8%), followed by Pronaf and technical assistance (14.9-16.3%), by all policies together (15.8-15.9%), and by technical assistance and seeds (14.6%). Nevertheless, only the ATT

[1] Guerzoni, M., Raiteri, E. (2015). Demand-side vs. supply-side technology policies: Hidden treatment and new empirical evidence on the policy mix. *Research Policy* 44, 726-747.
[2] Rosenbaum, P.R. (2002), *Observational Studies* (New York: Springer, 2nd edition).

of the mix between Pronaf and technical assistance is robust to unobservable variables, according to the Rosenbaum test. The impact of the policy mixes is smaller than the sum of the impacts of the isolated policies, which in turn is larger for Pronaf (11.7-14.6%) followed by technical assistance (9.3-9.8%), and non-significant for the seeds.

Discussion and Conclusion	***100 – 250 words***

These results confirm previous qualitative findings that the Pronaf is a policy targeted to market-oriented farms. Indeed, a large number of its recipients are from Southern Brazil, where most capitalised, monocultural farms are located. Our results also support the perception of seed distribution as a policy targeting poorer farmers, which are not necessarily market-oriented; a stronger focus on family self-provisioning, instead of commercialisation, can be also explained through the higher prevalence of women among its recipients. Technical assistance aims at promoting better integration between different farming activities, including non-commercial crops and small-scale breading, which explains its mid-way position between Pronaf and seeds. Due to the well-defined goals and longer history of Pronaf, its impact tends to "dominate" even when it is associated to other policies, including seeds. Although for most policy mixes the number of adopting farmers is too small to draw very robust conclusions, our findings suggest that the impact is smaller than the sum of the single policies in isolation. Also, in no cases we observe a reduced market orientation of the policy recipients, suggesting that these policies (or at least Pronaf and technical assistance) are not used to increase self-consumption through resource internalisation.

While the Ministry of Agrarian Development has been dismissed in 2016 and the resources for family agriculture are progressively reduced in Brazil, better understanding the impact of these policies as well as their positive synergies and unwanted effects, is key to justify their preservation as they are or refinement.