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Fruit and Vegetable Planting Restrictions: Do U.S. Farmers Even Notice?

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1. Do planting restrictions matter to producers?

The 2008 U.S. Farm Bill restricts farmers from planting fruits and vegetables on their base acres. However, in response to claims by some producers that the supply of vegetables for processing was being constrained, Congress established a Pilot Program that, beginning in 2009, relaxed this restriction.

Do these restrictions in fact limit producers' ability to plant their acres in vegetables destined for processing? Producers' initial response to the Pilot Program has been limited, so to understand how farmers will respond in the long-run, we examine farmers' historical treatment of their non-base acres, on which they are free to plant whatever they want.

The number of non-base acres at each farm's disposal essentially represents the amount of "flexibility" a farmer has available to respond to market signals.

2. Linking vegetable acres to processor locations

Policy Variable of Interest
Using 2009 Farm Service Agency data covering hundreds of thousands of farms in the seven Upper Midwest States, we use reported non-base acres planted in the following seven vegetables for processing: cucumbers, sweet corn, sweet peas, pumpkins, lima beans, snap beans, and tomatoes.

Controls
A critical determinant in a farmer's vegetable acreage decision is the cost of transporting crops to the processor. Since farm-level transport costs are not observable, we construct a proxy variable by calculating the distance between each farm and the nearest vegetable processor.

Moreover, farmers must allocate their non-base acres across competing uses, such as corn destined for ethanol production. Again, we measure the distance between each farm and the nearest ethanol plant.

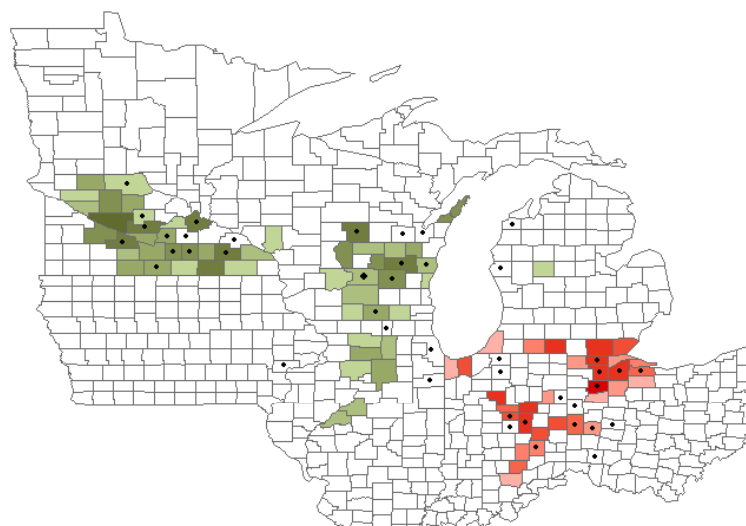


Illustration of pea and tomato producers and processors in the Upper Midwest in 2009 (Source: USDA, Farm Service Agency) Note: Green indicates acreage in peas, red indicates acreage in tomatoes. Darker shades represent more acres. Circles represent the region's pea and tomato processors.

Selected Results

An additional non-base acre on the farm translates into an extra 0.38 acres planted in vegetables for processing. For farmers with experience planting vegetables, the marginal effect rises an additional 0.1 acres.

Variable	Marginal Effect	Std. Error
non-base acres	0.38	0.007
non-base acres · experience	0.10	0.003

Notes: Sample size is 249,543. This represents all farms located in counties in which vegetables were planted at least once in the last decade. A Tobit model is estimated for which 4,389 farms reported non-zero acres in vegetables for processing. Experience is defined as having planted any vegetable for processing in the prior year (2008).

3. Modeling the production decision

The central hypothesis is that farmers are constrained from producing their profit-maximizing level of vegetables by the number of non-base acres at their disposal. This hypothesis is specified as:

$$y_{ij} = \beta_0 + \beta_1 x_{1ij} + \sum_{n=2}^k \beta_n x_{nij} + \delta_j + \varepsilon_{ij}$$

where y_{ij} is farm i 's (in state j) number of vegetable acres for processing, and x_1 is the number of non-base acres on the farm. A positive and significant value of β_1 implies that additional non-base acres (i.e., increased planting flexibility) leads to more acres planted in vegetables.

Controls x_n include farm base acres, distance to vegetable processors and ethanol plants, and farmer experience. We also include an interaction term between experience and non-base acres. The term δ_j represents a control for state j 's effects.

4. Restrictions matter, but not a lot!

See Selected Results Box. The coefficient on non-base acres emerges positive and statistically significant, controlling for different processor locations, farmers' vegetable experience and state-level effects.

Recall that non-base acres serves to proxy for acres released under the Pilot Program. But the effect of non-base acres on area planted in vegetables is not very large, suggesting that relaxing fruit and vegetable restrictions, an outcome intended by the Pilot Program, is not likely to cause dramatic shifts in the planting patterns of U.S. farmers.

Caveats: This study is restricted to vegetables destined for processing in the seven Upper Midwest States. Future research can broaden the product and geographic scope to determine whether these results are more broadly applicable.

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