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Old Order Amish Settlements and New York Farmland Markets



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Abstract

Affordable farmland has been a major factor fueling population growth among the horse-and-buggy driving population in New York. To better understand this relationship, we used a directory of local Amish church leadership to approximate the location of nearly all New York Old Order church districts from 1999 to 2015. The centroid of all addresses associated with each district's leadership was matched to New York farmland sales transactions within a 10-mile radius from the same period. We then conducted a trend analysis of farmland prices with and without Amish influence in four regions of New York state. We find that having a nearby Amish district was associated with lower prices at the state level but not necessarily the region level, and prices generally grew at a similar but slightly lower rate for farmland with nearby Amish districts. In some regions, farmland with a higher density of nearby Amish districts experienced higher growth in sale prices. Further, soil quality of transacted parcels doesn't have a consistent relationship with proximity of an Amish district.

INTRODUCTION

New York has approximately 16,000 Old Order Amish church members living in 120 districts, the fifth-largest population after Pennsylvania, Ohio, Indiana, and Wisconsin (Elizabethtown College, 2017). The Old Order Amish emphasize family and community ties and living separate from the modern world. In order to minimize their involvement with external society, farming has become their main way of protecting their religion and culture as well as the main driver of their economy (Johson-Weiner, 2010). Many Old Order Amish in New York came from Pennsylvania and Ohio to look for cheaper farmland (Johson-Weiner, 2010; Reid, 2015). The agricultural lifestyle of the Old Order Amish has been maintained in many of their New York settlements (Amish America, 2014). Their growing role of the Amish in New York agriculture, as well as agriculture in many other states, motivates our analysis of Amish population and farmland markets.

Farmers, rural appraisers, and other farmland market observers often report that Amish communities usually purchase relatively lower-valued land, but that over time they compete for land with conventional producers. “Amish influence” is a commonly mentioned driver of farmland value growth and market activity in New York. Another anecdote is that “conventional farmers” have to increase their profitability to compete with Amish for farmland. However, we know of no empirical analyses of the role of Amish in farmland markets. Past studies have largely focused on Amish farming practices and demographic changes. After a brief description of Amish farming practices, we describe how we approximated the location of these communities and matched them with farmland transactions data. Next, we conduct a basic trend analysis of farmland prices around Amish settlements. This study tests some of the “conventional wisdom” about Old Order Amish population growth and also provides an empirical foundation for future work in this area.

AMISH FARMING PRACTICES

Few remaining traditional farming societies still exist in the United States, and the Old Order Amish is one of the most representative. While Amish farming has evolved over time, Amish farming is notably different from modern or conventional agriculture. Use of horses and mules instead of tractors is one of their most well-known farming traditions. The use of horses not only guarantees Amish people’s participation in farm labor but also provides an important source of fertilizer by producing manure. As a result, most Amish farms are small-scale; usually between 60 and 100 acres because of the limitations imposed by using human and animal labor (Zook, 1994).

Even though Amish communities usually try to avoid using recent technologies, some innovations such as mechanical milkers, veterinary services, pesticides, and artificial cattle insemination have been selectively adopted by some communities after consideration of the impacts on Amish religion and way of life.

Amish farming is characterized by a diversity of crop and livestock production activities. Depending on community activities and family interests, Amish farmers might grow wheat, corn, alfalfa, hay, tobacco, vegetables and fruits; have herds of milk cows; or raise poultry, cattle, mules, and horses. As most of what is fed to animals is grown on the farm, they produce more types of grain and maintain a more frequent crop rotation than non-Amish farmers. A common rotation employed by Amish farmers is a three-year cycle of corn-oats-hay, with the main difference from the non-Amish being the inclusion of oats into crop rotations to provide feed for horses (Blake et al, 1997).

Small-scale production and diverse land use patterns illustrate the primary focus of Amish agriculture — self-sufficiency. In lieu of expanding production to better their economic conditions, Amish farmers focus on generating outputs sufficient to allow them to live consistently with their beliefs. Self-sufficiency and labor-intensive farming minimize their need for more agricultural inputs and capital. Therefore, Amish farmers are relatively more independent from external markets and have less reliance on lenders. With generally lower living and production expenses, Amish farmers are able to easily keep money within their communities and seldom suffered the financial stresses that put a large number of non-Amish farmers out of business in the early 1980s (Logsdon, 1988).

Major Amish settlements in New York include Conewango Valley, Heuvelton, Clymer, and Mohawk Valley. Affordable farmland has provided an opportunity for the Amish in New York to maintain an agrarian lifestyle, including traditional farming, traditional handicrafts, and raising livestock. Livestock and horse auctions are popular events. Dairy farming is a major economic activity in many New York Amish settlements, with many Amish farmers supplying milk to local cheese factories (Amish American, 2014; Johson-Weiner, 2010). Amish society is largely organized in settlements and church districts. “Settlement” describes the geographical location where a group of Amish people live. A typical church district is led by its own ministry (randomly selected bishop, elders, and deacons) and contains approximately 30 Amish families. When a district becomes too large (approximately 40 families), it usually splits into separate districts. We use church district to approximate the level nearby Amish population in this study.

DATA AND APPROACH

To approximate the location of Old Order Amish districts, we use a similar approach as Wilson, Lonabocker, and Zagorski (2016), who used the published addresses of Amish church district leadership from the *The New American Almanac* (commonly referred to as Raber's Almanac) as a proxy measure for the distribution of the Amish population across Ohio and Pennsylvania. In brief, the address of church district leadership was entered into geo-locating software to search for the nearest residence that showed characteristics associated with the Amish. Their research produced a fine-scale map of the density of Amish settlements in these two states. While their objective was to locate Amish households, our goal was to approximate the location of each church district. Some similar disclaimers apply however, such that we do not have comprehensive population data and that there may be errors in addresses or missing information from Raber's Almanac.

There are some practical considerations for future replications of our approach. Addresses from Raber's Almanac can be scanned and converted to tabular (Excel) format, but additional data cleaning is essential, as well as knowledge of Amish settlement patterns and farming. While some addresses were incomplete or incorrect in earlier years, they could be matched with completed addresses from later years or fixed through simple investigation in Google Maps. In a handful of cases, we could not locate all addresses, so relied on fewer addresses (usually at least two) per district to calculate the centroid. When we entered some incorrect or incomplete addresses into geo-locating software, some incorrect coordinates were generated. We were usually able to fix these through visual inspection on ArcGIS and Google Maps. Further, district names often change in trivial ways between years, such as the addition of a year to the district name. Some districts appeared to be missing in certain years, so we added them to our data set if they were listed in Raber's Almanac in previous and subsequent years. In summary, digitizing and geo-locating these addresses requires careful, methodological attention to detail.

There were usually three addresses for leadership/ministers of each Amish church district, ranging from two to five. We matched the centroid of leadership addresses from 1999–2015 with farmland sales from the same period. Farmland sales data were provided by the New York Office of Real Property Tax Services. Sales price is calculated by dividing total sale price by total sales acres for each transaction. All land classified as agricultural (codes 100–199) is used in our study, although we do drop sales of less than 1 acre or more than 5,000 acres. We similarly drop sales less than \$50 per acre or more than \$20,000

per acre. Farmland sales in suburban counties and Long Island are dropped because of insufficient observations. More details on this data set can be found in Bigelow, Ifft, and Kuethe (2017). For each farmland parcel sold during our study period, we count the number of Old Order Amish districts within a 10-mile radius from 1999–2015. We then estimate a linear trend for each parcel and use the fitted values for number of districts to account for population growth. That fitted value is believed to best describe the current Amish population near the parcel when it was transacted.

We first conduct a simple analysis at state level, looking at price trends between parcels with and without Amish settlements within a 10-mile radius (which we also refer to as “nearby” or Amish influenced). Then we remove counties that had no Amish districts, to have a more comparable set of farmland transactions. There are few Amish districts in the Hudson Valley and Capital regions of New York, which also face higher levels of development pressure. The second part of the trend analysis is conducted at the regional level. Based on the larger patterns of Amish settlement, counties with Amish districts are broken down into four regions across the state: Western NY, Finger Lakes, Central NY, and St. Lawrence Valley. A handful of relatively isolated districts are not included within any of these four regions. We further exclude Yates County, which has a large Old Order Mennonite population (Reid, 2015). The annual increase in number of Amish districts near a transacted parcel is calculated to represent the growth rate of Amish settlements in each region. In addition, we divide parcels in each region into four groups or quartiles, according to number of nearby Amish districts.

We also evaluate soil quality of parcel sold, to understand whether (1) Amish are purchasing lower quality land and (2) whether soil quality could explain the price differential between land with and without Amish influence. Soil quality is based on two measurements, the first of which is the New York Soil Group number. This is a soil quality index developed specifically for taxation of agricultural land in New York state and is based on productivity for corn and hay production (New York State Department of Agriculture and Markets, 2017). Soil Group Numbers range from 1 to 10, with 1 being the highest quality and 10 being the lowest. The second measurement is National Commodity Crop Productivity Index (NCCPI), which expresses the inherent capacity of the soils in a given field to produce commodity crops. The NCCPI uses a scale of 0 to 1, with 0 having a lower productivity potential and 1 higher potential (USDA NRCS, 2012).

RESULTS AND DISCUSSION

One of the main objectives of this study is to locate the Old Order Amish population in New York and match their location to farmland sales. Figure 1 shows all farmland sales in New York from 1999–2015. Parcels within 10 miles of an Amish district are shown in colors, with region (see previous section) indicated in the legend. Most of the Old Order Amish are concentrated in the Chautauqua-Allegheny region in Western New York, the middle area of the Finger Lakes region, northern New York (centered around St. Lawrence County), and Mohawk Valley (central New York). Areas without farmland sales represent urban areas, the Adirondack National Forest (northern New York), and the Catskills (Hudson Valley/southeast New York).

Figure 2 shows the average number of Amish districts near each farmland parcel that was transacted from 1999–2015. There was an average of 0.3 districts near each parcel sold in 1999 and 1.2 in 2015, indicating that the average number of nearby Amish districts increased by nearly 0.1 annually. This reflects the growing Old Order Amish population in New York during this period, as well as their growing influence on agriculture and farmland markets.

We next consider price trends in areas with and without Amish districts. Figure 3 shows the price of farmland with and without Amish settlements nearby. The size of the scatter plots reflects the relative acreage sold each year. The highest prices from 1999–2015 were for all parcels without any nearby Amish settlements, and the lowest prices were for parcels with nearby Amish districts. The prices for parcels with no nearby Amish districts reflect farmland sales in regions adjacent to New York City and Albany with little to no Amish population and higher levels of development pressure. Hence, we also consider parcels with no nearby Amish districts that are located in counties that also have parcels with nearby Amish. While still having lower prices than all non-Amish influenced parcels statewide, this restricted set of parcels without Amish influence still is higher-valued than parcels with nearby Amish. For both the statewide and restricted set of parcels without Amish influence, mean prices are statistically different from Amish-influenced parcels at the 1 percent test level for all years, with the exception of the restricted set of parcels without Amish influence in 1999. This may reflect differences in soil quality, improvements, or nonagricultural influences. Overall, this finding is consistent with Amish communities settling in areas with cheaper farmland. We also observe a slightly lower but similar growth rate of farmland prices for farmland with Amish influence.

We conduct a similar analysis at the regional level in Figure 4. Despite the difference in price trends among regions, the price of parcels near Amish districts usually begins at a lower position and rises at a slightly slower rate, consistent with statewide trends from Figure 3. However, for most years in most regions, the price between parcels with and without Amish influence is not statistically different. This suggests that Amish may choose to settle in regions of New York with relatively more affordable farmland, but do not necessarily take the same approach within the regions where they are already settled. In addition, the Amish settlement growth rate in each region is indicated in Figure 4. It is difficult to relate this growth rate with either the price starting point or the growth of prices. For example, Western NY and St. Lawrence Valley share a similar growth rate of Amish settlements and farmland values in 1999, but farmland values grew at a fast pace in the Western NY. This likely reflects the stronger overall growth of the agricultural sector in Western NY.

The state and regional price analysis in Figures 3 and 4 only considered the presence of Amish districts but not the density of districts. In Table 1, we consider farmland growth trends by density of Amish districts. For each region, we created four quartiles of the number of nearby Amish districts for all parcels sold from 1999–2015. The first quartile for each region is no nearby districts and is hence larger than the other quartiles. Regional differences in price growth become more pronounced when separating sales by density of nearby Amish.

In all regions other than St. Lawrence, the highest price growth rates occurred within either the first or second quartile of Amish settlements among all regions. The differences probably reflect the diverse agriculture, recreation, and Amish settlement patterns in each region. Western NY has older and denser Amish settlements than other regions. The reason for the differences in Western NY is not apparent and could be the result unobservable factors, such as various improvements, between parcels with different levels of Amish influence. Central NY has a relatively newer Amish population, but an inconsistent relationship between Amish density and farmland sales price. The Finger Lakes region has growing farming and tourism sectors overall, as well as a relatively smaller Amish population. In this region, Amish density is negatively correlated with farmland sales price. St. Lawrence region overall has lower farmland prices and few alternative uses beyond agriculture. For this region, in areas with the highest levels of Amish density (Q4), Amish influence may play a large role in farmland price growth.

Many factors could be influencing the differences between sales prices for farmland with and without Amish influence. We conclude our analysis by considering whether the soil quality of farmland sold around Amish settlements is different. We use two measures of soil quality, New York Soil Group number (Table 2) and NCCPI (Table 3). Findings using both measures are consistent. For Western and Central NY, soil quality using both measures is statistically different for parcels by Amish influence. However, the magnitude of difference is generally small and lower for Amish-influenced parcels in Western NY and higher for Central NY. The difference in the Finger Lakes is only marginally significant, and there is no difference for St. Lawrence. Overall, these findings suggest that soil quality is not a major factor in prices differences for farmland with and without Amish influence.

CONCLUSION

The growth of Old Order Amish settlements and their distinctive agricultural practices are changing New York agriculture. As such, the Amish are now major players in farmland markets in many parts of New York. This study demonstrates a methodology for mapping the distribution of Amish districts and linking Amish districts to farmland sales, which may be useful to rural appraisers and also have wider application beyond farmland markets. We conduct a basic analysis of farmland price trends by level of Amish influence from 1999–2015. We find that at the state level, parcels sold near Amish districts are on average cheaper than those distant from Amish districts, which is consistent with farmland affordability being a major consideration for Amish settlements. However, the growth rate of land near Amish population tends to be similar or slightly lower than land without Amish influence. The relationship between both density of Amish districts and soil quality with farmland values is inconsistent across regions and motivates future research using multiple regression analysis. Many unanswered questions remain, and we look forward to further in-depth analysis of Amish population growth using general farmland valuation models.

Similar to Wilson, Lonabocker, and Zagorski (2016), we would like to note that we hope to maintain a balance between better understanding the role of Amish communities in New York agriculture while respecting their desire to live separately from the “outside world.” As such, we do not intend to make the addresses of church leadership publicly available but are happy to cooperate with researchers and appraisers to share our data and approach.

FOOTNOTES

1. It is important to note that lower values for New York Soil Group number imply higher soil quality, while NCCPI is the opposite.

REFERENCES

- Amish Population Change 2012–2017*. Young Center for Anabaptist and Pietist Studies,
- Elizabethtown College. Elizabethtown, PA, 2017. https://groups.etown.edu/amishstudies/files/2017/08/Population_Change_2012-2017.pdf.
- Blake, Katharine V., Enrico A. Cardamone, Steven D. Hall, Glenn R. Harris, and Susan M. Moore. “Modern Amish Farming as Ecological Agriculture.” *Society & Natural Resources* 10, no. 2 (1997): 143–59.
- Bigelow, Daniel P., Jennifer Ifft, and Todd Kuether. “The Compatibility of Farmland Sales and Opinion Survey Data.” Working paper. Dyson School of Applied Economics and Management, Cornell University. Ithaca, NY, 2018.
- Johnson-Weiner, Karen M. *New York Amish Life in the Plain Communities of the Empire State*. Ithaca: Cornell University Press, 2017.
- “New York Amish.” Amish America Why Don’t Amish Serve in the Military Comments. Accessed August 10, 2018. <http://amishamerica.com/new-york-amish/>.
- New York State Department of Agriculture and Markets (2017). How agricultural assessment values are determined. <https://www.tax.ny.gov/research/property/assess/valuation/01ag.htm>.
- Raber, Aden. 1999–2015. *The New American Almanac, 2000–2016*. Baltic, NY: Raber’s Book Store.
- Reid, Judson. “Old Order Mennonites in New York: Cultural and Agricultural Growth.” *Journal of Amish and Plain Anabaptist Studies* 3, no. 2 (2016): 212–21.
- Stinner, Deborah H., M.G. Paoletti, and B.R. Stinner. “In Search of Traditional Farm Wisdom For a More Sustainable Agriculture: A Study of Amish Farming and Society.” *Agricultural Ecology and Environment*, 1989, 77–90.
- User Guide for the National Commodity Crop Productivity Index (NCCPI)*. Natural Resources Conservation Service, 2012.
- [file:///C:/Users/Dell/Downloads/NCCPI_user_guide%20\(2\).pdf](file:///C:/Users/Dell/Downloads/NCCPI_user_guide%20(2).pdf).
- Wilson, Andrew M., et al. “Online Mapping Tools for Geolocating Amish Settlements.” *Journal of Amish and Plain Anabaptist Studies*, vol. 3, no. 2, 2016, pp. 202–211.
- Zook, Lee. “The Amish Farm and Alternative Agriculture.” *Journal of Sustainable Agriculture* 4, no. 4 (1994): 21–30.

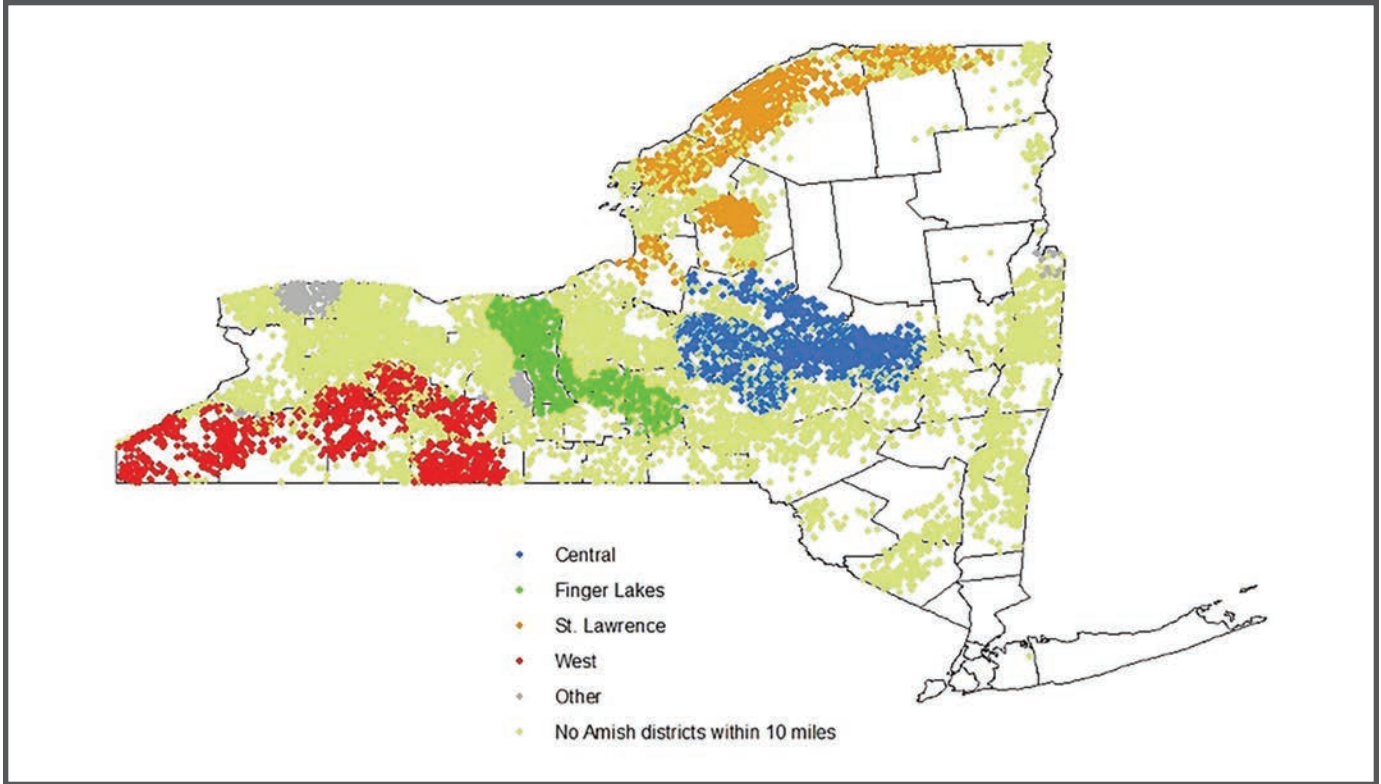


Figure 1: New York farmland sales with nearby Amish districts, 1999-2015

Note: All colored parcels are within 10 miles of an Old Order Amish district and grouped by relative geographic proximity (region), unless otherwise indicated. A district is a group of Old Order Amish families that live near each other and attend church together on a biweekly basis. "Other" refers to farmland near Amish districts that are relatively isolated or in Yates County, which has a large Old Order Mennonite population (Reid, 2015). Data on farmland sales are from the New York Office of Real Property Tax Service, and Amish district location is based on Raber's Almanac.

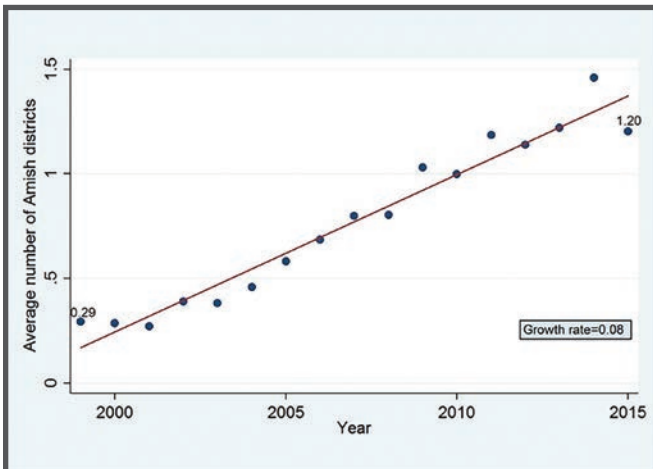


Figure 2: Average number of Amish districts located near New York farmland sales

Note: Average number of Amish districts within 10 miles of a farmland transaction

Source: New York Office of Real Property Tax Services and Raber's Almanac.

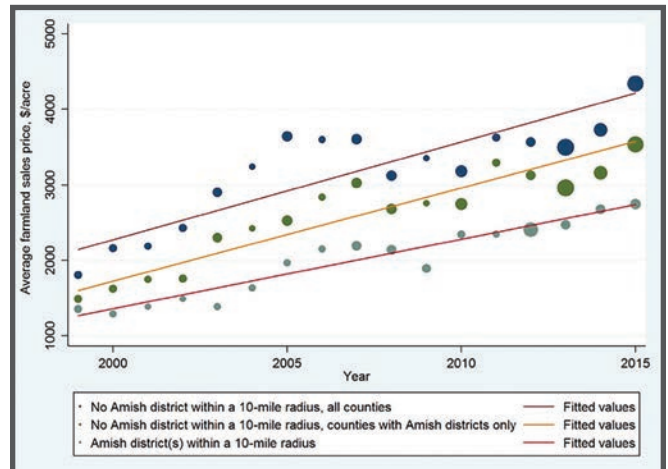


Figure 3: New York farmland prices by proximity of Amish districts, 1999 to 2015

Note: Scatter plot points are weighted by total acreage sold in each category.

Source: New York Office of Real Property Tax Services and Raber's Almanac.

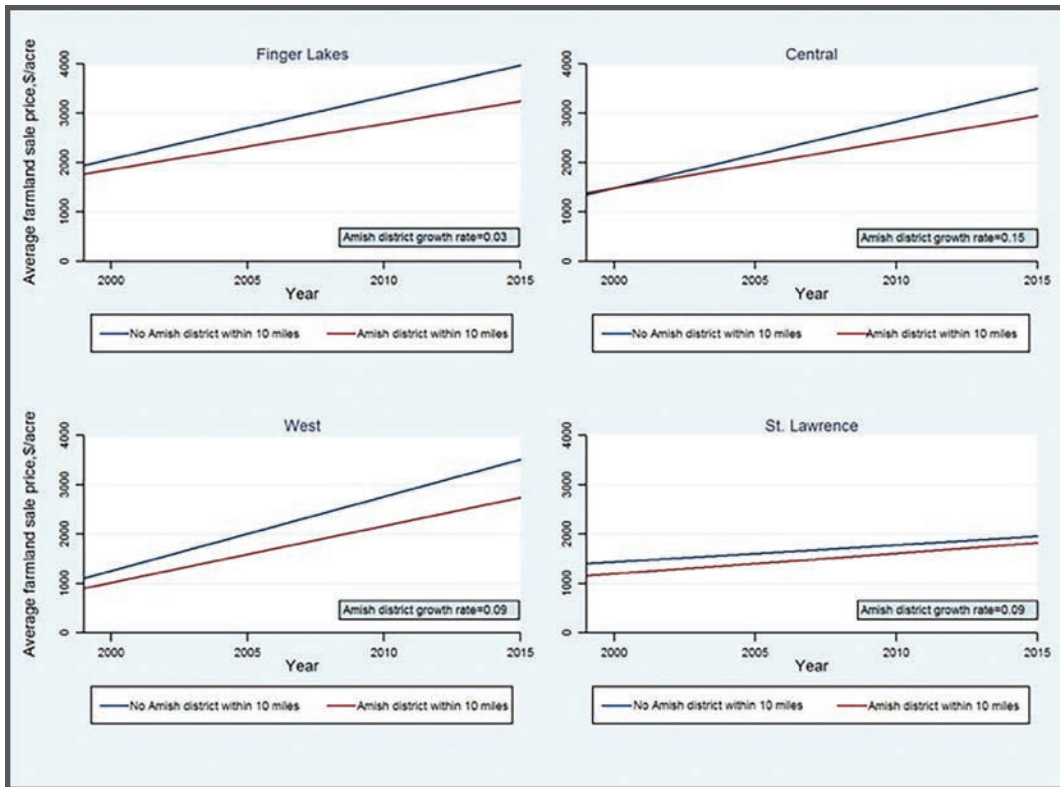


Figure 4: New York farmland prices by Amish influence and region, 1999–2015

Note: Region as indicated in Figure 1.

Source: New York Office of Real Property Tax Services and Raber’s Almanac.

Table 1: Annual farmland price growth rate by level of Amish Influence, 1999–2015 (\$/acre/year)				
Region	Amish District Quartile			
	Q1	Q2	Q3	Q4
Western NY	\$128	-	\$122	\$111
Central NY	\$129	\$166	\$80	\$109
Finger Lakes	\$134	-	\$115	\$90
St. Lawrence	\$37	-\$29	-\$24	\$96

Note: We measure the number of Amish districts within a 10-mile radius of each parcel of farmland sold. Each quartile is based on dividing all farmland sales from 1999–2015 into four groups based on how many Amish districts are found near the sales. There is a larger number of parcels with no nearby Amish districts in Quartile 1.

Source: New York Office of Real Property Tax Services and Raber’s Almanac.

Table 2: Farmland soil quality by Amish influence

Region	Avg. NY Soil Group #		T-Test Result	
	Without Amish Influence	With Amish Influence	T-value	Significance
Western NY	5.5	5.7	-2.95	***
Central NY	5.5	5.3	2.85	***
Finger Lakes	4.8	4.9	-1.69	*
St. Lawrence Valley	4.5	4.4	1.27	

Source: New York Office of Real Property Tax Services, Raber's Almanac.

Note: A soil group number of 1 is the highest possible soil quality, 10 is the lowest. The t-statistic tests whether the difference between the NY Soil Group Number of parcels sold with and without Amish within a 10-mile radius equals zero. Single, double, and triple (*, **, ***) denote statistical significance at the 10%, 5%, and 1%, respectively.

Table 3: Comparison between the NCCPI of parcels sold with and without Amish settlements nearby

Region	Avg. NCCPI		T-Test Result	
	Without Amish Influence	With Amish Influence	T-value	Significance
Western NY	0.4	0.38	4.13	***
Central NY	0.38	0.45	-17.22	***
Finger Lakes	0.47	0.46	1.84	*
St. Lawrence Valley	0.35	0.35	-0.75	

Source: USDA NRCS, New York Office of Real Property Tax Services, Raber's Almanac.

Note: For NCCPI, 0 is the lowest soil quality, 1 is the highest. The t-statistic tests whether the difference between the NCCPI of parcels sold with and without Amish within a 10-mile radius equals to zero. Single, double, and triple (*, **, ***) denote statistical significance at the 10%, 5%, and 1%, respectively.