Welfare Gains from Market Integration Under Competing Land Uses*

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Abstract

The welfare gains from agricultural market integration are conventionally measured by the capitalization of market access into farmland values. That aggregate omits parcels that convert to non-agricultural use, because they drop out of the agricultural census, so farmland values are a lower bound on welfare gains. Using the staggered rollout of the US Interstate Highway System (1940–2002), we trace where the gains accrued. Farmland values rose about 14% after a highway arrived, even as agricultural production value fell and farmland left agriculture. The pattern is consistent with rising development pressure near existing towns and a shift from livestock toward crops on the land that stays in farming. Farmland values therefore understate the gains from market integration most where land is converting to other uses, on the urban periphery near growing towns.

KEYWORDS: highways, agriculture, market integration, comparative advantage, farmland values

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1 Introduction

Welfare gains from agricultural market integration are conventionally measured by the capitalization of market access into farmland values (Donaldson and Hornbeck, 2016). That measure is a lower bound wherever integration also raises the non-agricultural option value of land, especially at the urban periphery (Baum-Snow, 2007): a parcel that converts to developed use exits the Census of Agriculture's sampling frame, so the value it carries into its new use leaves the farmland measure entirely. This paper documents where that omission arises, using the staggered rollout of the US Interstate Highway System as a setting where competing, non-agricultural land-use margins are active.

We study how market access capitalizes into county farmland values and how it changes the acreage actually farmed. Prior work (Donaldson and Hornbeck, 2016; Chan, 2022) on transportation and US agriculture studies railroads on an open frontier where land had fewer potential outside claimants. The Interstates arrived in a different setting. The era of large-scale land settlement had passed, and output gains could no longer come from bringing new territory into farming, as they did in the railroad era. Land markets were active, non-agricultural demand was substantial, and farmland values faced competing pressures. Because farm returns and outside-option value enter the same land use margin symmetrically, no single land-value measure can separate them. The standard approach to measuring welfare gains from market access in agriculture is therefore a lower bound wherever land markets are active enough for this margin to matter.

We begin by estimating the reduced-form impacts of the Interstate Highway System. The staggered construction of Interstate Highway segments across rural counties, concentrated in 1954–1969, provides variation in when individual counties gained highway access, driven by state-level construction priorities rather than contemporaneous agricultural conditions. Using county-level Census of Agriculture data for 1940–2002, we treat the staggered rollout as a difference-in-differences design. The imputation estimator of Gardner et al. (2024) recovers the average effect of IHS access on farmland values and

agricultural production in counties that received a highway.

The average effect on farmland values cannot tell us whether the gain in asset prices comes from agricultural returns or from a rising outside option. Development pressure is not directly observed, so we build a fine-grained, pre-interstate measure of proximity to urbanized areas, following Burchfield et al. (2006). We first calculate the share of each county's land that was not yet developed in 1940, using gridded historical land-cover data (Leyk and Uhl, 2018). We then compute the share of that convertible land within a population-scaled reach of a 1940 town; as in a market-potential function, larger towns reach farther. The measure uses only 1940 land cover and population, so it is fixed before highway construction began and cannot be a consequence of the network. The resulting index is a continuous measure of how exposed a county's farmland was to non-agricultural demand over the second half of the century, and we let the treatment effects vary along it.

Counties that gained IHS access saw farmland value per acre rise about 14 percent on average over the post-treatment window, a figure that grows to about 27 percent forty years after construction. Farm counts and cropland both declined, and agricultural revenue per acre fell even as the asset price rose. This is the composition problem that aggregate farmland values cannot resolve: an interstate opening raises both agricultural returns and the outside-option value of land (Floyd, 1965; Plantinga et al., 2002), and Ricardian capitalization captures both without separating them. Identifying which channel dominated where requires tracing production outcomes separately across the land quality distribution.

We next split the effect by land suitability. The value-per-acre gains fall with suitability: about 17 log points on the least-suitable land (FAO classes N and S3), 11 on moderately suitable land (S2), and 6 on the most suitable (S1) land. Farmland acreage shows no comparable gradient across classes. The largest gains in land value thus accrue where higher agricultural returns are least likely to explain them.

Development pressure shapes where land leaves agriculture. Counties under the highest pressure see the largest gains in farmland value and the largest loss of farmland, about 7 percent, and the same holds for counties within 50 kilometers of a 1960 metropolitan area. Letting the effect vary continuously with pressure within each suitability class shows two distinct patterns. The value gain on the least-suitable land appears even where measured pressure is zero. Where pressure is high, value per acre rises instead on the more suitable land, large farms become fewer, and farms switch from livestock to crops. The switch to crops may account for part of the value gain near towns, but it does not offset the loss of livestock revenue, which drives the aggregate decline in revenue per acre.

Three alternative specifications address threats to identification. First, highway access may reach beyond the counties a route crosses, so we test whether effects extend to counties within 75 kilometers of an Interstate county. Revenue per acre falls in these adjacent counties too, by about 70 percent of the direct effect, while their land values rise only late in the period. Second, a staggered difference-in-differences estimate grows with the length of the post-treatment window as effects accumulate. A long-difference design avoids this: it relates each county's change in outcomes over the whole period to its change in market access, which every county receives at an intensity set by its distance to the network. Third, where routes were placed could itself be correlated with agricultural change, directly or through pre-existing development pressure. We therefore instrument the change in market access with the Pershing Map indicator of Frye (2026). The 1922 military plan fixed its routes decades in advance; some later became Interstates, while others were never built because of budget limits. In the IV estimates, farmland values rise and revenue per acre falls with market access, and the developed share of land and median home values rise as well.

Our results add to structural evidence on agricultural reallocation driven by comparative advantage (Costinot et al., 2016; Sotelo, 2020; Pellegrina and Sotelo, 2025; Farrokhi

and Pellegrina, 2023; Adamopoulos, 2025). The mechanism differs across these settings: migration (Pellegrina and Sotelo, 2025), productivity gains (Adamopoulos, 2025), and producer selection on heterogeneous land (Sotelo, 2020). Chan (2022) provides the only prior reduced-form test in the same US agricultural context, using identical FAO GAEZ suitability data and a market access design, and finds no comparative-advantage-driven specialization for 19th-century railroads. Output gains came through extensive-margin expansion on an unsettled frontier. On the settled frontier of the interstate era, by contrast, we show that market integration reorganizes existing land along comparative advantage. After the Interstates, the value-per-acre response diverges across the suitability distribution. It rises most on the least-suitable land and is muted on the most suitable, and under development pressure farms on every class of land shift from livestock toward crops.

We also contribute to a literature on the historical economic impacts of environmental shocks and interventions that matter for agricultural production, including infrastructure interventions (Hornbeck and Keskin, 2014a; Hornbeck, 2010; Lewis and Severnini, 2020), climate change and weather shocks (Schlenker et al., 2005; Hornbeck, 2012; Deschênes and Greenstone, 2007), and public agricultural research investment (Kantor and Whalley, 2019). We show that the Interstates changed where agricultural production happened and created outside pressures on farmland that persist today. Urban and spatial economics also studies this tension between agricultural and non-agricultural land use (Plantinga et al., 2002; Heblich et al., 2020; Fajgelbaum and Schaal, 2020; Nagy, 2022). We show where farmland values understate the gains from market integration when land can move out of agriculture.

Lastly, we contribute to a literature that measures the economic value of transit infrastructure in the US (Baum-Snow, 2007; Michaels, 2008; Chandra and Thompson, 2000; Frye, 2026). Michaels (2008) shows that highways raised the relative return to skill where skills were abundant and reduced it elsewhere. Our results are the land-use counterpart,

with land suitability in place of skill. Prior work attributes the mid-century transformation of agriculture (farm numbers falling by two-thirds, average farm size tripling, and agriculture's employment share dropping from 12 to 2 percent between 1950 and 2000) mainly to concurrent technological change (Olmstead and Rhode, 2001; Hornbeck and Keskin, 2014a; Gardner, 2002; Dimitri et al., 2005). Kim et al. (2025) document who left agriculture under the IHS, finding large individual gains in earnings and educational attainment as workers moved out of farming and into services; we document what happened to the land they left behind, studying county-level farm structure, production intensity, and land allocation rather than individual labor market outcomes. The Interstates raised land values most on the least-suitable land and reorganized production on a settled frontier rather than opening new land, which makes highway access a force in agricultural restructuring alongside the technological forces that prior work emphasizes.

The rest of the paper proceeds as follows. Section 2 describes how the Interstate system was planned and built and how American agriculture changed over the same decades. Section 3 introduces the data, including our measure of development pressure, and Section 4 sets out the two research designs. Section 5 presents the results, and Section 6 concludes.

2 Background: Highways and Agricultural Production

2.1 The Interstate Highway System

Planning for a national highway network began with national-defense considerations long before the Federal-Aid Highway Act of 1956. General Pershing's 1922 military road survey, the earliest national plan of its kind, identified roughly 78,000 miles of strategic routes based on military priorities. Subsequent federal planning in the 1940s refined this into a designated system of approximately 41,000 miles that directly informed the 1956 Act, which authorized a national network of limited-access, high-speed roadways for

long-distance freight and passenger movement (Swift, 2011; Rose, 1990).[1]

Construction timing, by contrast, was determined after designation: although over 90 percent of planned mileage was open to traffic by 1980 (Swift, 2011), the year individual counties received segments varied widely. The IHS was approximately 90 percent federally funded, but states retained latitude to prioritize the sequencing of work within their designated routes (Karnes, 2009; Rose, 1990). Initial post-1956 construction in cities proceeded rapidly under federal-state design standards before community opposition slowed urban segment completion in the late 1960s (Brinkman and Lin, 2024). Among counties that eventually received segments, those with stronger growth prospects tended to get them earlier (Frye, 2026).

2.2 American Agriculture at Mid-Century

At mid-century, the typical rural county contained roughly 1,700 farms; approximately 30 percent of farmland was operated by tenant farmers rather than owner-operators; and the market reach of any given farm was constrained by the cost and speed of available transport, particularly for perishable products that required rapid movement to processors and consumers (Gardner, 2002; Dimitri et al., 2005).

Farm numbers fell by roughly 60 percent between 1950 and 2002: county-average counts declined from approximately 1,675 in 1950 to 650 by 2002, with the steepest decline concentrated between 1950 and 1975, the decades of peak IHS construction (Dimitri et al., 2005; Cochrane, 1979; Gardner, 2002; Olmstead and Rhode, 2001). Surviving farms grew larger: the share of operations exceeding 500 acres doubled from roughly 10 percent in 1940 to over 20 percent by 1960, and continued rising gradually through the end of the study period (Dimitri et al., 2005). Mechanization accelerated throughout: tractors per farm rose more than sixfold between 1940 and 1990 as animal power gave way entirely to machinery (Olmstead and Rhode, 2001). Land classified as farmland contracted modestly

[1] We use the Pershing Map as a robustness check on route placement; see Section 4.

from its early-1950s peak, while cultivated cropland acreage remained stable; the reduction in farm acreage was concentrated in pasture and non-harvested land rather than in the cropped area itself (Gardner, 2002). Tenancy fell sharply over the same period, from roughly 30 percent of farmland operated by tenants in 1950 to under 10 percent by 1970, as mechanization and consolidation shifted the economics of farm organization toward owner-operation (Gardner, 2002; Dimitri et al., 2005).

Trucking displaced rail as the primary mode of agricultural freight movement over the decades when the IHS was built. By the late twentieth century, trucks carried most of the nation's food supply by value. The interstate network supported regional distribution hubs, national commodity markets, and just-in-time input delivery, which extended a farm's market reach well beyond what pre-highway transport allowed (McCoy et al., 2020).

Agricultural product market value per acre roughly tripled in real terms between 1940 and 2002, while farmland values per acre rose roughly fivefold. Appendix Figure A1 shows that the two series co-moved through the late 1960s, then diverged: farmland values rose sharply through the 1970s commodity boom, corrected during the 1980s farm financial crisis (Gardner, 2002; Melichar, 1979), and rose again through the 1990s. By 2002, farmland values carried a wider premium over agricultural revenue than at mid-century. Farmland values rose faster than agricultural rents because farmland prices capitalize non-agricultural options alongside current farm income: development potential from expanding urban areas, speculative demand linked to infrastructure access, and rents from federal commodity programs (Plantinga et al., 2002; Floyd, 1965).

3 Data

Measuring how the Interstates changed agriculture takes four kinds of information: county agricultural outcomes over the whole period, the quality of each county's land for crops,

its exposure to urban development before the highways arrived, and the timing and reach of highway access. We describe each in turn.

Agricultural Data We use county-level data on US agriculture for 1940–2002 from Haines et al. (2018), drawn from the Census of Agriculture. The census was taken roughly, but not exactly, every five years, which gives 14 observations before, during, and after the Interstate rollout. We use four groups of outcomes.

First, agricultural land values measure the potential value of production. They capitalize expected future returns to agricultural production (Mendelsohn et al., 1994). Following Donaldson and Hornbeck (2016), we use farmland value per acre as the summary measure of how highway access changed the expected productivity of local agriculture, and total farmland value as its county aggregate.

Second, farm structure and land use are measured by the number of farms, the number of farms over 500 acres, and acres of farmland, cropland, harvested cropland, and pastureland. These show whether the Interstates led to farm consolidation and changed the extensive margin of land use.

Third, production and its composition are measured by the market value of agricultural products (in total and per farmland acre), crop revenue per harvested acre, livestock revenue per pastureland acre, cattle and hog inventories, orchard, vegetable, and perishable acreage, the share of harvested acres in the county's top four crops, and the share of farms operated by tenants. Orchard, vegetable, and perishable acreage use 1940–1974, the years with a consistent census definition. These show whether activity shifted between crops and livestock and whether production became more specialized.

Fourth, input use is measured by tractors per farm, farm labor expenditure per farm, and fertilizer and agricultural chemical expenditure per cropland acre. These show whether better market access changed mechanization and input intensity.

Crop Suitability We classify each county's land by its suitability for crop production using gridded indices from the Global Agro-Ecological Zones database of the Food and Agriculture Organization of the United Nations (GAEZ v.4).[2] GAEZ combines a location's climate, natural resource, and soil endowments with agronomic crop-growth models. The data form a 9 km by 9 km global grid that records each cell's attainable yield for each crop, and they are commonly used to measure a location's comparative advantage or natural endowment in specific crops (Costinot and Donaldson, 2012; Bustos et al., 2016; Costinot et al., 2016; Adamopoulos and Restuccia, 2022).

We focus less on how the Interstates changed the choice among crops than about overall suitability for any type of crop production, so we use these data to characterize counties by their suitability for the leading US crops as a group. We aggregate each surface to the multi-crop level by taking the pixel-wise mean across the SUIT-9 commodity bundle.[3] Each pixel's mean score is assigned to one of the four standard FAO classes on the 0–$10{,}000$ scale: N (not suitable, score $<$ 2500), S3 (marginally suitable, 2500–5000), S2 (moderately suitable, 5000–7500), and S1 (highly suitable, $\geq$ 7500). A county's suitability is the vector of its area shares in the four classes, which sum to one (Appendix Figure A2 maps these shares). Keeping all four shares preserves differences in composition across counties that a single dominant-class indicator would throw away. The main heterogeneity estimates use the rainfed high-input surface and group the thinnest classes into three: N+S3, S2, and S1. The appendix reports estimates on the rainfed low-input surface, where N is a class of its own and S2 and S1 are combined. We do not use the irrigated surface, because irrigation depends on capital investment that may itself respond to

[2]We use the rainfed suitability indices for 1961–1990 under two input levels. The high-input index builds in returns to mechanization, fertilizer, and improved varieties; the low-input index is closer to a place's natural endowment, as in Adamopoulos and Restuccia (2022), but describes a less mechanized agriculture than mid-century US farming. Input use may itself respond to market access, which favors the low-input surface as a measure of endowment. We report the main heterogeneity estimates on the high-input surface, which better matches the agriculture of the period, and the low-input results in the appendix.

[3]The SUIT-9 bundle is corn, wheat, soybean, sorghum, barley, oats, cotton, Irish potato, and rice. We use the mean rather than the pixel-wise maximum across crops because the maximum over-weights the best-suited crop and ignores diversification.

market access, and irrigation spread unevenly across counties over this period (Hornbeck and Keskin, 2014b).

3.1 Measuring Development Pressure

The development-pressure moderator M_c is a predetermined index of each county's exposure to urban development pressure: the share of its convertible 1940 land lying within reach of a nearby town. We build it in three steps: locate the 1940 towns, draw a population-scaled reach around each, and compute the share of a county's convertible land those reaches cover.

Towns and their reach. A town is a 1940 incorporated census place of at least $25{,}000$ residents, taken from the complete full-count census-place layer (Appendix Figure A3). Each town gets a circular reach whose radius grows with its population, $r_j = \min\{k\, P_j^{1/3},\ 75 \text{ km}\}$. The cube root comes from urban allometry: built-up area grows roughly in proportion to $P^{2/3}$, so the radius of a town's developed core grows as $P^{1/3}$. We pin the scale k so that a city of one million residents reaches sixty kilometers. The implied reaches are eight kilometers for a town of $2{,}500$, eighteen for $25{,}000$, and twenty-eight for $100{,}000$, and the 75-kilometer cap binds only for a handful of the largest metropolitan cores. Larger cities reach farther, but less than proportionally, so the largest cities do not dominate the surface. The reach depends only on 1940 census population, so it is predetermined to the interstate.

Convertible land. The denominator excludes developed land and water. A $250\,\text{m}$ cell is convertible if its 1940 built-up intensity is below $1{,}000\,\text{m}^2$ of gross indoor floor area and it is not open water. The threshold matters because HISDAC-US built-up intensity counts every type of structure, including farm buildings (Leyk and Uhl, 2018; McShane et al., 2022). A simple presence rule would classify dispersed farmsteads as developed,

especially in densely settled farm regions with good records. We calibrate the threshold externally, as the level that best separates incorporated census places of at least $2{,}500$ residents from the rural background. The built-up record also misses towns in some regions. For these towns we impute the developed footprint from the relationship between footprint, population, and region among towns the record does cover, and we net the imputed core out of the denominator like any other. The imputation uses only population and region, so it carries no market-access information.

The measure. The county index is the share of a county's convertible land that falls within at least one town's reach,

$$M_c = \frac{\int_c \mathbf{1}\{x \in \bigcup_j \text{reach}_j\}\, \mathbf{1}\{x \text{ convertible}\}\, dx}{\int_c \mathbf{1}\{x \text{ convertible}\}\, dx} \in [0, 1]. \tag{1}$$

Overlapping reaches from neighboring towns are counted once. Because developed and water cells are excluded from both the numerator and the denominator, M_c is the share of a county's *remaining convertible* land under pressure, not the share of its total area. Towns and reaches both come from 1940 geography, so M_c cannot respond to the interstate. We compute M_c at four town-population cutoffs ($2{,}500$, $10{,}000$, $25{,}000$, and $50{,}000$), with $25{,}000$ residents as the baseline and the other three as robustness checks. Figure 1 maps the result. Pressure concentrates in the Northeast megalopolis and the Great Lakes belt, and the agricultural interior is near zero. This concentrated pattern, rather than a smooth continental gradient, is what separates M_c from market access.

Interstate Highways IHS route locations come from the Federal Highway Administration's National Highway System, distributed through the Bureau of Transportation Statistics National Transportation Atlas Database (Federal Highway Administration, 2024). Construction timing comes from the Brooks and Liscow (2023) replication of the federal

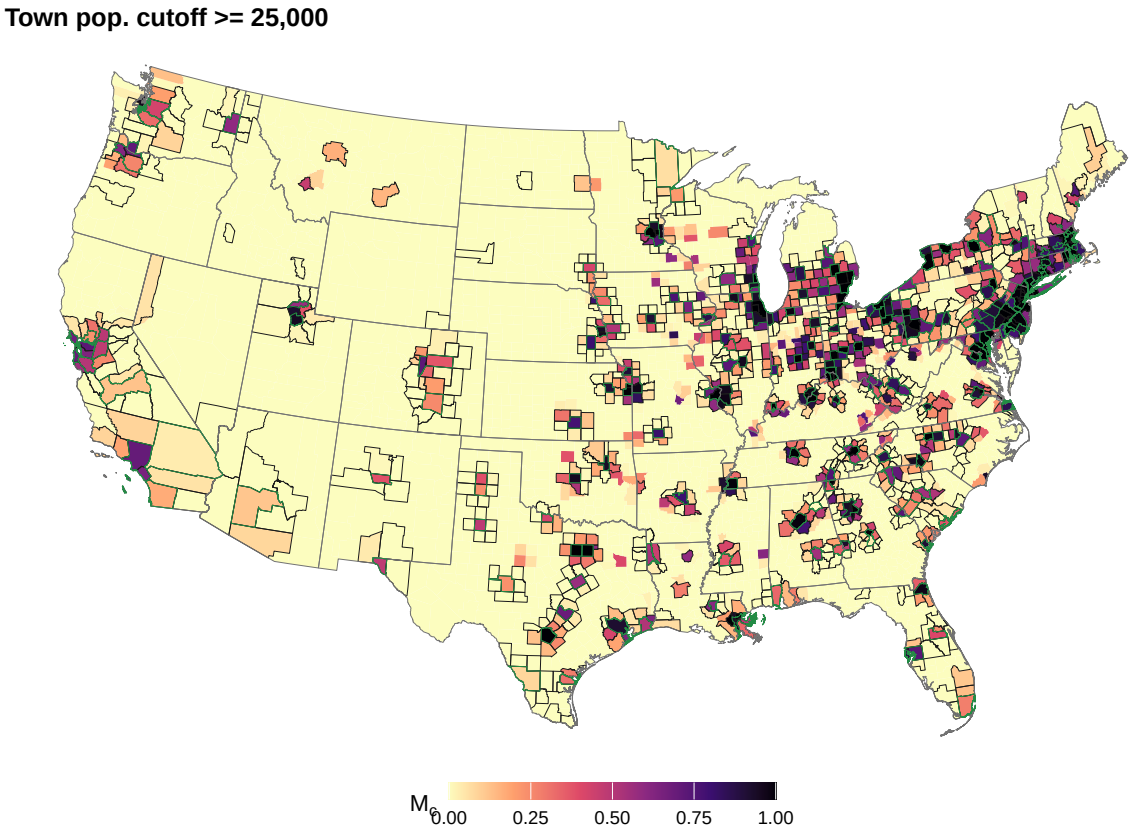


Figure 1: County development pressure M_c, towns $\geq 25{,}000$. The share of each county's convertible 1940 land within a city-size-scaled reach of a town. Pressure concentrates in the Northeast megalopolis and the Great Lakes industrial belt, with scattered Southern, Texan, and coastal-California metros; the agricultural interior, Great Plains, and Mountain West are near zero.

PR-511 highway database, which underlies the approach in Baum-Snow (2007). The PR-511 reports progress at selected mile markers across the network rather than at every mile; Brooks and Liscow (2023) match these sparse records to the true construction history for each segment. The raw PR-511 includes several construction-phase dates, and we follow Baum-Snow (2007) and Brooks and Liscow (2023) in classifying two: the groundbreaking date, when construction began on a segment's first mile, and the opening date, when that mile was first open to traffic. Appendix Figure A4 shows the distribution of each. Groundbreaking dates are concentrated in a narrow window beginning in 1954, while opening dates are spread across two decades as construction proceeded at different paces across states and terrain. We therefore use the groundbreaking date as treat-

ment timing in the difference-in-differences specifications and the opening date to add segments to the road network when we construct market access for the long-difference specifications. Where PR-511 records are incomplete, we supplement with Rand McNally historical highway maps and state highway department construction archives assembled in Frye (2026).

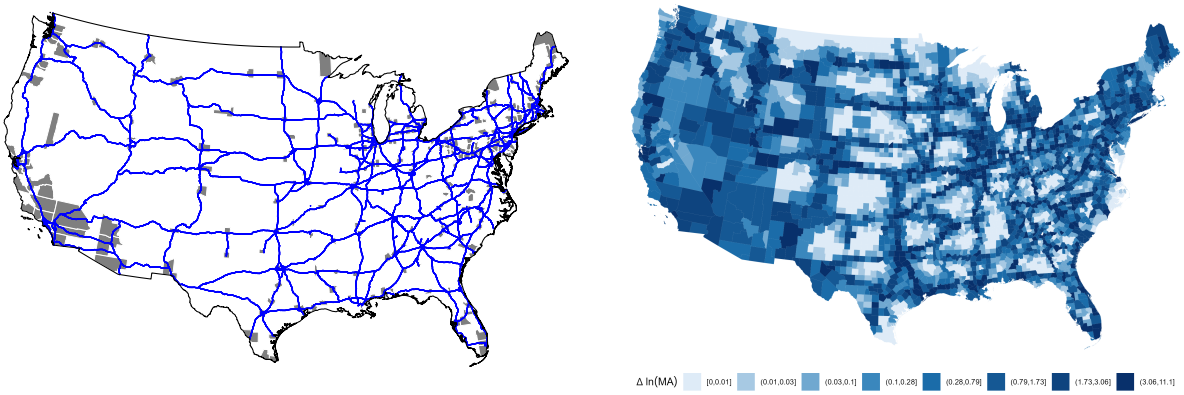
The sample is limited to IHS construction completed by 2002, the final year of the agricultural census panel. Counties whose first segment opened after 2002 are coded as never-treated. Appendix Figure A5 maps the network at 1960, 1970, and 2002. Completed segments in 1960 and 1970 are scattered across nearly every state rather than advancing on a single front, because states controlled their own construction timelines under the federal cost-sharing formula. Most of the eventual system was open by 1970, so the bulk of the identifying variation falls in the mid-1950s through the 1960s and later-treated counties serve as valid controls throughout most of the panel. In some specifications we restrict the sample to rural counties outside Metropolitan Statistical Areas and exclude counties at IHS network junctions, where multiple routes intersect and highway access reflects the network's nodal structure rather than the market-integration margin we study. Appendix Figure A6 maps the excluded counties.

Market Access We measure each county's market access following Herzog (2021). For county i in year t,

$$MA_{it} = \sum_{j \neq i} w_j \, d_{ijt}^{-\zeta}, \tag{2}$$

where d_{ijt} is the least-cost travel time in hours from county i to county j over the road network in place in year t, w_j is county j's 1950 population, and ζ governs how quickly the value of a distant market decays with travel time.[4] We set $\zeta = 8.22$, the trade elasticity

[4]The baseline network is the 1947 Rand McNally road layer, to which we assign a uniform speed of 35 miles per hour. Interstate segments enter the network in the year they open, and their speeds are the posted limits recorded in the modern National Highway System layer, matched to each segment by nearest distance within 500 meters. Where no match exists, we assign 65 miles per hour. Because posted limits are modern values applied to every year, the speeds capture differences across segments but not changes in



(a) Interstate Highway Routes, 2002

(b) Changes in Log Market Access, 1940-2002

Figure 2: Interstate Highway Routes and Changes in Market Access

Note: Panel (a) displays the completed Interstate Highway Routes as of 2002. Panel (b) displays county-level changes in market access between 2002 and 1940 resulting from Interstate Highway construction. Darker blue counties had the largest gains. Lighter counties also gained market access from the Interstates, but by less than counties close to the network.

used by Donaldson and Hornbeck (2016), and report a lower bound of $\zeta = 3.6$ in the appendix. The network combines the 1947 Rand McNally road layer with the Interstate segments described above, added as they open. Population weights are fixed at 1950, so all variation in MA_{it} over time comes from the expansion of the Interstate system.

Market access rises in every county as segments open anywhere in the system, but by different amounts depending on how close and well connected a county is to the new roads. Our regressor is the change in $\ln MA$ between the mean of 1940, 1945, and 1950 and the mean of 1992, 1997, and 2002, which averages out single-year noise. At $\zeta = 8.22$, the change has a mean of 1.08 and a standard deviation of 1.53 across counties; Figure 2b maps changes in market access, with the largest gains along the Interstate corridors.[5]

Control Variables The historical priorities that shaped IHS route placement (Section 2.1) imply systematic differences between counties that received the IHS and counties that did

limits over time.

[5]We also build a change in market access over an intermediate window ending with the mean of 1969, 1974, and 1978, by which time most of the system was open. We focus on the longer window because agricultural outcomes may respond to market access only gradually.

not. We start from the covariates Michaels (2008) uses for a similarly rural IHS sample and expand them following Frye (2026). We group these baseline county characteristics into three dimensions. The first is population and urbanization at midcentury (Schroeder et al., 2025). The second is market centrality, measured two ways: market potential and a betweenness centrality measure constructed from the 1947 Rand McNally national route plan. Market potential weights surrounding population by distance, capturing the population a county can reach; betweenness centrality counts the number of shortest-path trips between intersection nodes that pass through the county, capturing its position in the underlying road network (Appendix Figure A7). The third is alternative transit infrastructure, comprising the rail network (Atack, 2016) and proximity to ports, airports, and inland waterways (Frye, 2026).

Appendix Table A1 reports baseline characteristics for IHS and non-IHS counties, organized along these three dimensions. IHS counties were larger, more urban, and growing faster at midcentury, with closer proximity to existing metropolitan centers. They were more central in the pre-IHS road network and had greater access to surrounding population. They were also better connected to alternative transit modes, including rail, ports, and airports. These differences are consistent with the planning narrative in Section 2.1, and they motivate the controls in Section 4.

Descriptive Evidence In the aggregate, farm value per acre had risen to roughly 4.9 times its 1940 level by 2002 and agricultural product value per acre to about 3.1 times, the divergence described in Section 2 (Appendix Figure A1).

Appendix Table A2 reports county-level agricultural outcomes for IHS and non-IHS counties in 1950 and 2002. Both groups experienced the consolidation that characterized US agriculture during this era: farm counts fell by roughly sixty percent, farmland contracted, and labor expenditure per farm roughly doubled. The largest IHS-vs-non-IHS divergence is in farmland values per acre: IHS counties moved from $984 in 1950 to

$4,011 by 2002, non-IHS counties from $797 to $3,020, and the gap widened from $187 per acre to $991. Crop revenue per harvested acre and the share of cropland in the top four crops rose more in IHS counties; livestock revenue rose less.

Splitting counties by GAEZ crop suitability reveals large differences behind these aggregate trends (Appendix Figure A8). Unsuitable counties grew farm value per acre roughly twice as fast as Suitable counties in proportional terms, ending the period at 6.6× their 1940 level versus 3.3× for Suitable counties. They also followed a more pronounced boom-and-bust trajectory in farmland, expanding to a peak of ∼1.14× the 1940 base by 1955 before contracting faster than Suitable counties through the late twentieth century.

4 Empirical Strategy

The balance and descriptive comparisons in Section 3 show that Interstate counties differed from other counties before the highways arrived, so raw differences in outcomes mix the effect of highway access with the selection described in Section 2.1. Our empirical strategy separates the two, using the rollout of the Interstate Highway System to measure changes in agricultural outcomes over the following decades. We use two designs. The first is a staggered difference-in-differences model, estimated with a method that avoids bias from negative weighting, that compares counties an Interstate crosses with those it does not. This strategy lets us trace dynamic treatment effects and check the conditional parallel-trends assumption. The second strategy is a long-difference model in a continuous measure of market access. Every county's market access rises as the system expands, but by an amount that depends on how close and well connected it is to the network and to population. The two designs rest on similar identifying assumptions and exploit similar variation, but they estimate different economic parameters.

Differences-in-Differences Design

Our staggered difference-in-differences (DiD) strategy measures how the local agricultural economy in a county evolves after IHS access, comparing IHS counties to non-IHS counties. We use county-level panel data at approximately 5-year intervals to estimate the two-way fixed effects model,

$$Y_{it} = \beta_1 \, \text{IHS}_{it} + \mathbf{X}_i' \boldsymbol{\gamma}_t + \alpha_i + \lambda_t + \varepsilon_{it}, \tag{3}$$

where Y_{it} is the outcome (measured in logs or shares) in county i in year t. IHS_{it} is a binary indicator of whether a county has an interstate highway constructed by year t, determined by the break-ground date of construction. The variables α_i and λ_t capture county- and year-fixed effects, respectively. Standard errors follow Conley (1999), allowing for spatial correlation across counties within 100 kilometers.[6] In our full specifications, we include regression weights based on 1950 county farmland acres. Weighting shifts the estimand from the average county, the level at which the Census aggregates, to the average acre of US farmland.

$\mathbf{X}_i' \boldsymbol{\gamma}_t$ comprises the vector of baseline control variables interacted with a year t indicator. The control vector groups baseline county characteristics into three categories, each measured before the IHS construction era and interacted with year fixed effects so that counties differing on these dimensions can follow distinct agricultural trajectories absent the IHS. Population and urbanization measures address the most direct threat: counties closer to cities and with larger populations were both more likely to receive early IHS access and were already on faster urbanization trajectories that independently reshaped agricultural activity.

Market centrality measures comprise 1950 market potential and the betweenness cen-

[6] Results are robust to alternative clustering schemes; Appendix Figure A9 compares the preferred Conley standard errors to county-level and county-by-state-year multi-clustering for the farmland value event study.

trality of each county in the 1947 highway network. Without these controls, the IHS estimate would partly recover the long-run effects of pre-existing market access; the 1947 betweenness specifically addresses the re-centering concern that Borusyak and Hull (2023) raise for instruments constructed from network exposure such as the Pershing Map.

Alternative transit infrastructure measures comprise rail access (Atack, 2016) along with proximity to ports, airports, and inland waterways. Rail in particular predicts both where IHS routes ran and pre-IHS agricultural structure; without this control, the IHS coefficient would partly recover the long-run effects of 19th-century railroad placement.

Because construction onsets are staggered across the panel, concentrated between 1954 and 1969 with a thin tail into the 1990s (see Appendix Figure A4), this research design is vulnerable to bias when estimated with standard OLS (Goodman-Bacon, 2021). We estimate equation 3 using the two-stage difference-in-differences (DID2s) estimator of Gardner et al. (2024). The DID2s estimator falls into a class of imputation estimators, including Borusyak et al. (2024).[7] This estimator removes covariates, group, and period effects in the first stage from a regression using *only* never-treated and not-yet-treated observations; the second stage then uses estimated residuals for *all* observations to identify the IHS effect. Identification requires that this first-stage factor structure imputes the correct counterfactual agricultural trajectory for IHS counties, conditional on the year-interacted control vector.

For this model, the identifying assumption is that, conditional on controls and fixed effects, agricultural outcomes would have evolved similarly in IHS counties as non-IHS counties (i.e., conditional parallel trends). Route placement was settled before construction began: General Pershing's 1922 military road survey identified strategic routes, subsequent federal planning in the 1940s refined the designated system, and the 1956 Federal-Aid Highway Act funded its construction (Swift, 2011; Rose, 1990). Construction timing

[7]We choose to estimate with Gardner et al. (2024) because the software package `did2s` by Butts and Gardner (2022) allows for the flexible inclusion of treatment-effect interactions and continuous treatment variables.

varied across counties after designation, with states retaining latitude to prioritize sequencing within their designated routes (Karnes, 2009); among counties that eventually received segments, the selection process tended to target counties with stronger prospective growth trajectories earlier (Frye, 2026). In some specifications, we restrict the sample to rural counties outside Metropolitan Statistical Areas and exclude counties at IHS network junctions, so that the remaining treated counties gained access because they lay between network nodes ("inconsequential units") rather than because routes were built to reach them. We also estimate the dynamic, event-study version of this specification, which lends support to the conditional parallel trends assumption.

Long Difference Market Access Design

The difference-in-differences design assumes that the IHS affects only the counties a route crosses. The literature more often measures transport shocks with changes in market access, which reach *all* counties. Both designs use variation from the build-out of the Interstate system, but in the market-access design, the shock decays with distance from the network. We estimate the response of agricultural outcomes to a county's change in market access,

$$\Delta Y_i = \alpha + \beta \, \Delta \ln MA_i + X_i'\gamma + \varepsilon_i, \tag{4}$$

where $\Delta Y_i = \bar{Y}_i^{\text{end}} - \bar{Y}_i^{\text{base}}$. Changes in market access are captured by $\Delta \ln MA_i = \overline{\ln MA_i}^{\text{end}} - \overline{\ln MA_i}^{\text{base}}$, where MA_i is defined in Equation 2. To reduce noise from any single census year, each endpoint is an average over three vintages: the baseline is the mean of 1940, 1945, and 1950, and the endpoint is the mean of 1992, 1997, and 2002 (we also present results for an intermediate window ending in the mid-1970s, when most of the system was open). X_i contains the same baseline controls as the DiD; they enter here as time-invariant levels because there is no panel dimension to interact them with. Observations are weighted by 1950 farmland acres, and standard errors follow Conley

(1999) with a 100 km cutoff, the same scheme as the difference-in-differences, because spatial correlation in a single cross-section is the binding concern.

The identifying assumptions for the long-difference model are similar to those underlying the difference-in-differences design: conditional on controls, no other factors correlated with IHS placement affected the trajectory of agricultural outcomes. While the DiD exploits both cross-sectional and temporal variation of construction, the OLS version of the long difference retains only the cross-section of changes, so the assumption rests entirely on which counties gained access, and changes in market access are more exposed to endogeneity. Following studies of highways and regional growth (Herzog, 2021; Frye, 2026), we instrument changes in market access with planned highway routes. Our approach uses the 1922 Pershing military route map:[8]

$$\begin{aligned} \Delta \ln MA_i &= \pi \, Pershing_i + X_i'\delta + v_i, \\ \Delta Y_i &= \alpha + \beta \, \widehat{\Delta \ln MA_i} + X_i'\gamma + \varepsilon_i, \end{aligned} \tag{5}$$

where $Pershing_i$ equals one if county i lies on the 1922 Pershing plan, and all other variables are as before. The estimated β is a local average effect for counties whose change in market access is shifted by lying on a plan route. The instrument must predict $\Delta \ln MA_i$, which the first-stage F-statistics confirm. Identification also requires that, conditional on controls, $Pershing_i$ does not affect agricultural outcomes between the end period and baseline, except through changes in market access. Realized market access reflects where and when states chose to build, partly in response to local growth prospects. Pershing route status, by contrast, was fixed by a 1922 military road survey decades before the outcome window. Conditional on baseline controls for network centrality and prior in-

[8] Herzog (2021) instruments with the 1947 highway plan, which proposed 38,000 miles of highway routes for national priorities prior to the 1956 Federal-Aid Highway Act. The 1947 plan very closely resembles what was actually constructed, creating a stronger first stage. The 1922 Pershing plan, on the other hand, laid out 78,000 miles of highways for national defense purposes. We prefer the Pershing plan as an instrument because its routes differ more from what was actually built three decades later. However, a consequence of this choice is a weaker first stage than the 1947 plan would predict.

frastructure, we argue that Pershing routes affect agricultural outcomes only through the market access the Interstate network later delivered along them.

5 Results

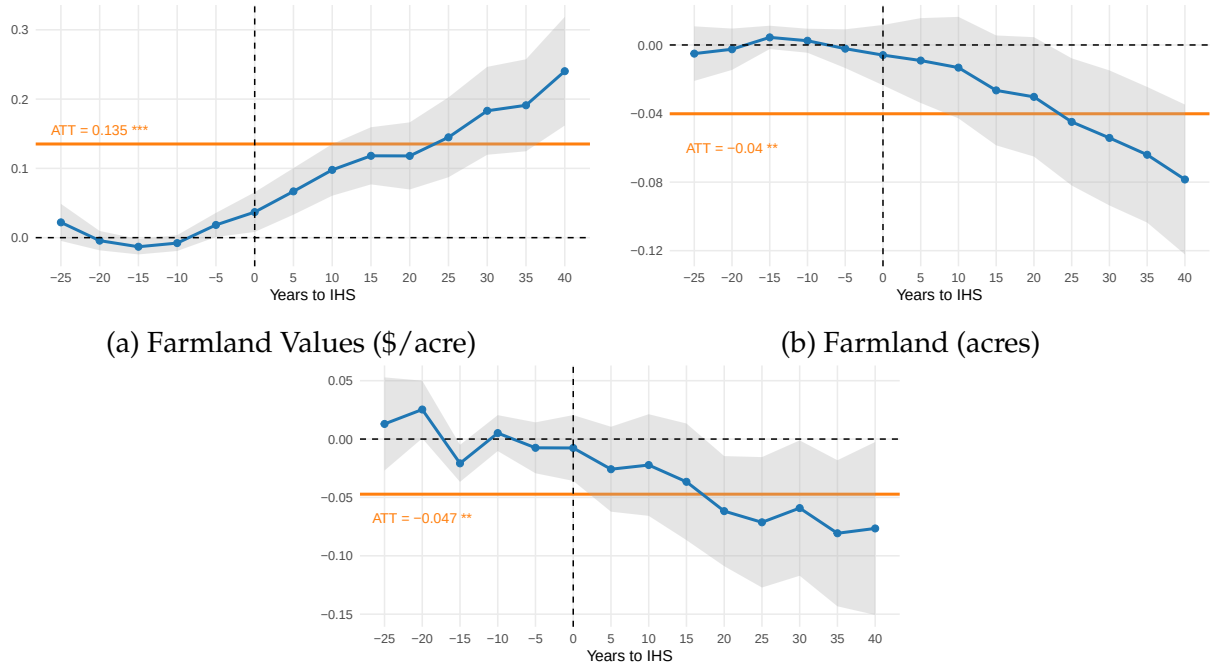
We present the results in four steps. We start with the average effect of Interstate access on farmland values, acreage, and revenue, and then ask how that effect varies with development pressure and land suitability. We next examine spillovers to neighboring counties and close with the long-difference estimates that use the Pershing plan as an instrument.

Event Study Results Figure 3a reports the event study for county farmland value per acre. Land values in Interstate counties rose relative to non-Interstate counties in the decades after construction. Over the entire post-treatment window, agricultural land values were 0.135 log points (about 14%) higher on average in Interstate counties, and forty years after construction they were about 0.24 log points (about 27%) higher.

Land in agriculture declined over the same period (Figure 3b). Farmland acres fell by about 4 percent on average (ATT -0.040) and about 8 percent forty years after construction, and agricultural revenue per acre fell by about 5 percent on average (ATT -0.047). Together, these results suggest that farmland values capitalized lower transport costs, but not only through agriculture: farmland contracted in IHS counties, which points to non-agricultural uses absorbing it for development.[9] This is consistent with past evidence that the IHS expanded suburbanization and development of urban industries, like retail and manufacturing (Chandra and Thompson, 2000; Baum-Snow, 2007; Michaels, 2008; Frye, 2026).

This is the central tension in the paper: land values rise, but revenue per acre does not. Rising values may instead reflect urban demand bidding up farmland. Falling rev-

[9] Pre-treatment coefficients in these figures are small relative to the post-treatment effects, which supports the conditional parallel-trends assumption.



(a) Farmland Values ($/acre)

(b) Farmland (acres)

(c) Agricultural Revenue ($/acre)

Figure 3: Event study estimates of IHS construction on farmland values, acres, and revenue

Note: Figures display coefficients from event study regressions estimated with the two-stage difference-in-differences estimator of Gardner et al. (2024). In panel (a), the dependent variable is logged farmland value ($ per acre). In panel (b) the outcome is farmland acres, and it is agricultural revenue per acre in panel (c). The regressions control for county and year fixed effects and controls for initial cross-sectional measures of urban proximity, market accessibility, and other transit infrastructure, multiplied by agricultural census year indicators. Standard errors are adjusted for spatial correlation within 100km. The gray area displays 95% confidence intervals. The orange lines indicate the average treatment effect over all years after IHS construction; *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels.

enue per acre may mean that the most productive parcels left the census frame for other uses and that the land still farmed supports lower-value commodities. The heterogeneity analysis below tests these mechanisms.

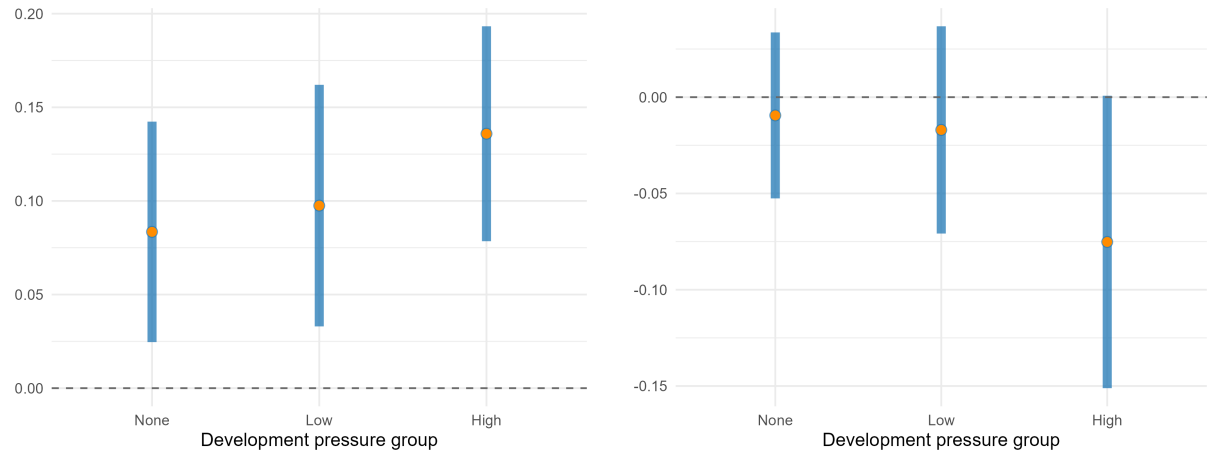
Figure A10 reports event study coefficients across other structural measures of the local agricultural industry. Across outcomes, pre-treatment coefficients are small relative to the post-treatment effects, and few are individually distinguishable from zero.[10] After Interstate highways, the total number of farms fell by about 3 percent on average (Panel (a);

[10]Appendix Figure A11 performs a Rambachan and Roth (2023) sensitivity analysis of parallel trend violation for this event-study. The results remain statistically distinguishable from zero at the 95% confidence level when hypothetical post-treatment parallel-trend violations are bounded by the magnitude of the largest observed pre-treatment deviation ($\bar{M} = 1$), and up to $\bar{M} = 1.25$.

ATT -0.033, significant at the 10 percent level), and the number of farms over 500 acres fell by about 21 percent (Panel (b); ATT -0.235). Farmland acres fell by about 4 percent (Panel (c)) and cropland by about 6 percent (Panel (d); ATT -0.065). Total agricultural revenue fell by about 9 percent (Panel (e); ATT -0.090) and revenue per farmland acre by about 5 percent (Panel (f)) in the decades following Interstate construction.

Development pressure and land competition The IHS raised market access for agriculture, but it also brought population growth, wider labor markets, and lower transport costs for other sectors. Together these forces can put pressure on land markets, especially where development potential is highest, close to existing urban areas. Figure 4 interacts IHS construction with indicators for three groups of counties: those with no measured development pressure, which are about two-thirds of the sample, and those with low and high pressure. Farmland values rose in all three groups, and the gain grows with pressure, from about 8 log points with no pressure to 10 with low pressure and 14 with high pressure. Farmland acreage tells a sharper story. It barely changes in the no-pressure and low-pressure groups, but falls by about 7 log points in the high-pressure group, an estimate at the edge of statistical significance.

Transport shocks raised land values everywhere, which points to positive welfare gains from the infrastructure. But land also left agriculture in large amounts where competition for it was strongest. That makes it less straightforward to infer welfare gains from Ricardian capitalization alone: the counties where land values rose most, those under the highest development pressure, also lost the most land from the census frame, presumably to higher-valued uses. The same pattern appears when we group counties by distance to the nearest 1960 metropolitan area instead (Appendix Figure A12): farmland value per acre rises most in counties within 50 kilometers, and only those counties lose a significant share of their farmland.



(a) Farmland Value ($/ acre)

(b) Farmland (acres)

Figure 4: Treatment effect heterogeneity by development pressure group

Note: Figures display heterogeneous treatment effects of IHS construction for counties with no measured development pressure ($M_c = 0$) and for counties with low and high pressure. The regressions are estimated via Gardner et al. (2024), control for county and year fixed effects, and control for initial cross-sectional measures of urban proximity, market accessibility, other transit infrastructure, and the development pressure category indicators multiplied by agricultural census year indicators. Standard errors are adjusted for spatial correlation within 100km.

The Role of Land Suitability Development pressure is one dimension along which the highway effect varies. Land quality is another, and in our data the two are nearly unrelated: suitability explains about 2 percent of the variation in development pressure. Under comparative advantage, market integration should affect land of different quality differently. We interact IHS_{it} in Equation 3 with the county's area shares in the FAO suitability classes on the rainfed high-input surface (the less-suitable N+S3, S2, and the highly suitable S1), so the treatment effect varies with a county's suitability composition. The first stage includes suitability-class $\times$ year trends.

Figure 5 reports the effects on farmland value per acre (Panel a) and farmland acres (Panel b) by suitability class. The value gains fall with suitability: about 17 log points in the N+S3 class, 11 in S2, and 6 in S1, the last not statistically distinguishable from zero. Farmland acres show no comparable gradient: the effects are small and not significant in every class (-2, -4, and -1 log points). The largest value gains therefore accrue on the least-suitable land, where higher agricultural returns are least likely to explain them. The

average effect across all interstate counties (Figure 3a) masks this heterogeneity, and the analysis below asks how much of it reflects development pressure.

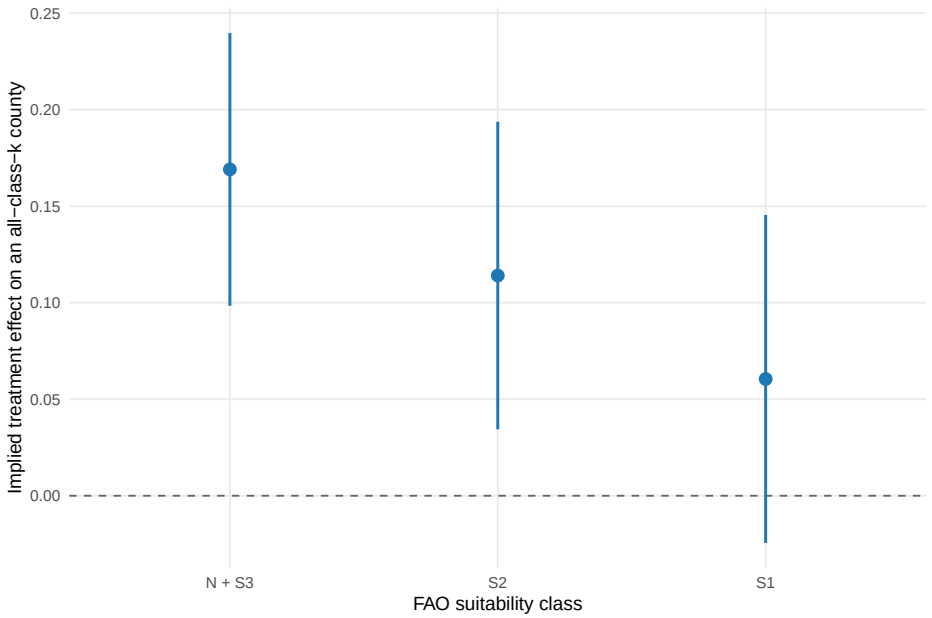
When IHS access is interacted with a continuous development-pressure measure, the IHS effect on farmland value is positive in every specification (full versus restricted sample, with and without the control vector, and area-weighted) and significant once the control vector is included (Appendix Table A3).

5.1 Suitability and pressure interactions

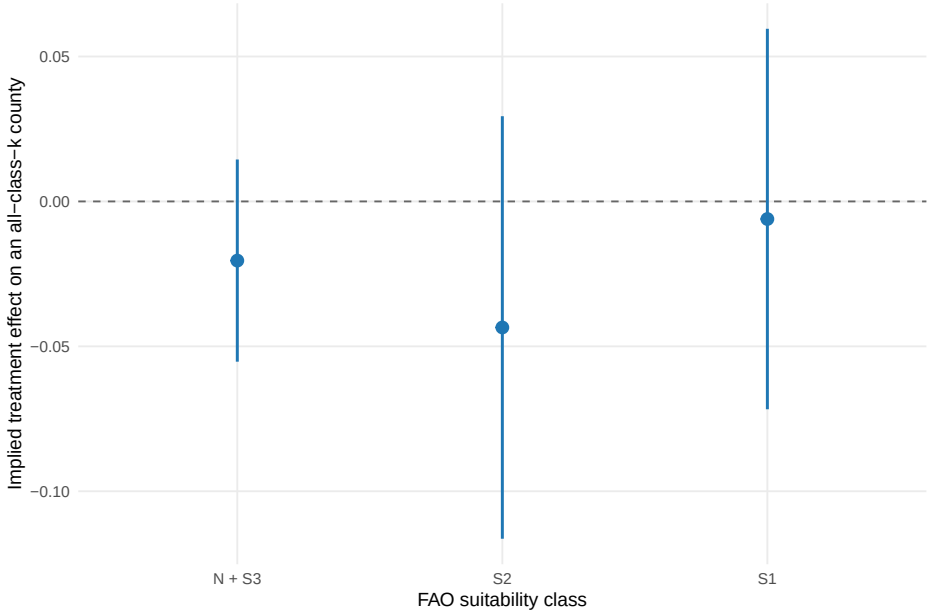
The suitability results above show a gradient in the highway effect. We now let that effect vary with suitability and development pressure at the same time. Table 1 interacts IHS access with the same rainfed high-input classes as Figure 5 (N+S3, S2, and S1) and with the continuous share M_c of each county's convertible land under pressure. The level columns give the IHS effect at zero development pressure, and the slope columns give the change in that effect from no pressure to full pressure. At zero pressure the pattern matches Figure 5: value per acre rises by 17 log points on N+S3 land, significant at the 1 percent level, with no significant change on S2 or S1, and no class shows a significant change in farmland. The value gain on the least-suitable land therefore does not depend on measured development pressure.

As developed share rises, farm structure and land values change. The number of farms over 500 acres falls in every class (slopes of -0.94, -0.54, and -0.41 for N+S3, S2, and S1, each significant at the 1 percent level). Value per acre rises with pressure on the more suitable land, by 0.19 on S2 and 0.21 on S1 (significant at the 5 and 1 percent levels), but not on N+S3 (0.04). Farmland acres show no significant slope in any class (-0.09, -0.03, and -0.07), so the net change in farmland within each class is too imprecise to detect.

Commodity switching: from livestock to crops. The revenue rows of Table 1 show farms switching from livestock to crops as development pressure rises. Crop revenue



(a) Farmland Value ($ per acre)



(b) Farmland Acres

Figure 5: IHS Treatment Effect by FAO Suitability Class

Note: Figure displays heterogeneous treatment effects of Interstate Highways by FAO suitability class, from a Gardner et al. (2024) two-stage difference-in-differences that interacts the IHS treatment with county area shares in the less-suitable (N+S3), suitable (S2), and highly suitable (S1) classes on the rainfed high-input GAEZ surface. Each point is the implied effect for a county fully in that class, estimated with suitability-class×year trend controls. The dependent variables are logged farmland value ($ per acre) and logged farmland acres in Panels (a) and (b). All models include county and year fixed effects and year-interacted controls for urban proximity, market access, and prior transit infrastructure. Conley (1999) standard errors with a 100 km cutoff; bars are 95% confidence intervals.

Table 1: Continuous dose-response: the IHS effect and the share of county land under pressure.

	N+S3 (marginal)		S2		S1 (prime)	
Outcome (ln)	level	slope/share	level	slope/share	level	slope/share
Farmland	−0.02	−0.09	−0.04	−0.03	0.01	−0.07
	(0.02)	(0.12)	(0.03)	(0.07)	(0.03)	(0.04)
Farms over 500 acres	−0.08**	−0.94***	−0.13	−0.54***	−0.01	−0.41***
	(0.03)	(0.14)	(0.09)	(0.14)	(0.10)	(0.14)
Value per acre	0.17***	0.04	0.06	0.19**	0.01	0.21***
	(0.04)	(0.19)	(0.05)	(0.08)	(0.05)	(0.07)
Ag. products revenue (total)	−0.04	0.02	−0.04	−0.27***	−0.03	−0.12
	(0.04)	(0.17)	(0.04)	(0.10)	(0.04)	(0.09)
Ag. products revenue per acre	−0.01	0.11	0.00	−0.23***	−0.04	−0.05
	(0.04)	(0.13)	(0.05)	(0.08)	(0.04)	(0.07)
Crop revenue (total)	−0.09	0.75***	−0.11	0.59***	−0.26**	0.62***
	(0.06)	(0.23)	(0.10)	(0.14)	(0.12)	(0.17)
Crop revenue per harv. acre	−0.02	0.69***	−0.03	0.38***	−0.16*	0.42***
	(0.05)	(0.17)	(0.07)	(0.11)	(0.09)	(0.11)
Livestock revenue (total)	0.05	−0.70***	0.04	−1.16***	0.01	−0.70***
	(0.06)	(0.22)	(0.09)	(0.16)	(0.08)	(0.13)
Livestock revenue per acre	0.08	−0.83***	−0.07	−0.78***	0.05	−0.48***
	(0.05)	(0.22)	(0.08)	(0.15)	(0.07)	(0.12)

Notes. The moderator M_c, the share of county convertible 1940 land within reach of a 1940 town, enters continuously and is interacted with the suitability class. *level* is the IHS effect for a county fully in the class at zero pressure; *slope/share* is the change in that effect per unit of pressure, that is, from no pressure to full pressure. The three classes enter as county area-shares summing to one: N+S3 pools the not suitable (N) and marginally suitable (S3) land, while S2 and S1 (prime) are kept separate. Because M_c is zero for 65 percent of counties, the slopes are identified from counties with positive pressure and are best read for their sign and significance; Appendix Table A4 reports the binary version. Gardner et al. (2024) two-stage difference-in-differences on the full county panel with the rainfed-high input suitability surface, weighted by baseline farmland acreage (winsorized at the 99th percentile); Conley (100 km) standard errors applied after the two-stage estimation. Suitability shares interact with year in the first stage. Outcomes are in logs; value outcomes are in real dollars. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

rises with pressure in every class, both in total (slopes of $+0.75$, $+0.59$, and $+0.62$) and per harvested acre ($+0.69$, $+0.38$, and $+0.42$), all significant at the 1 percent level. Livestock revenue falls just as consistently, in total (-0.70, -1.16, and -0.70) and per acre (-0.83, -0.78, and -0.48). At zero pressure neither changes significantly, apart from lower crop revenue on prime S1 land (-0.26 in total), so the switch is concentrated on the urban periphery.[11] Because crops earn more per acre near urban markets, the switch may account for part of the rise in value per acre with pressure on the more suitable land. It does not fully offset the loss of livestock, however. On S2 land, total agricultural revenue falls with pressure (-0.27) and revenue per acre falls as well (-0.23), the same gap between land value and revenue as in the aggregate estimates; on N+S3 and S1 the net change in total revenue is small and not significant. A binary version of the specification, which splits counties into those with and without measured pressure, shows the same livestock decline on S2 and S1 (-0.37 and -0.26 per acre) but not on N+S3 (Appendix Table A4). Appendix Tables A5–A7 report a broader set of outcomes on the rainfed low-input surface, where N is a class of its own; there, marginal land away from pressure expands cattle inventory ($+0.32$) and vegetable acreage ($+0.83$).

These results speak to the two explanations offered above for falling revenue per acre. Farmland does not fall more in the better suitability classes, so the estimates do not show the most productive parcels leaving agriculture first. Nor does the land that stays in farming move toward lower-value products: near towns it moves toward crops, which earn more per harvested acre. The aggregate decline in revenue per acre reflects livestock exit that the crop gains do not offset. In the long-difference IV estimates, livestock revenue per acre falls with market access while crop revenue per harvested acre does not change significantly (Table 2).

[11] Revenue aggregates cannot separate the loss of grazing from changes in dairy and feedlot production, which also move livestock revenue.

Robustness of the headline heterogeneity. Appendix Tables A8–A9 show the suitability gradient is robust to interacting IHS access, by suitability class, with four measures of proximity and pre-existing transit: metropolitan proximity, 1947 highway betweenness, rail density, and inland-waterway proximity.

5.2 Spatial Spillovers

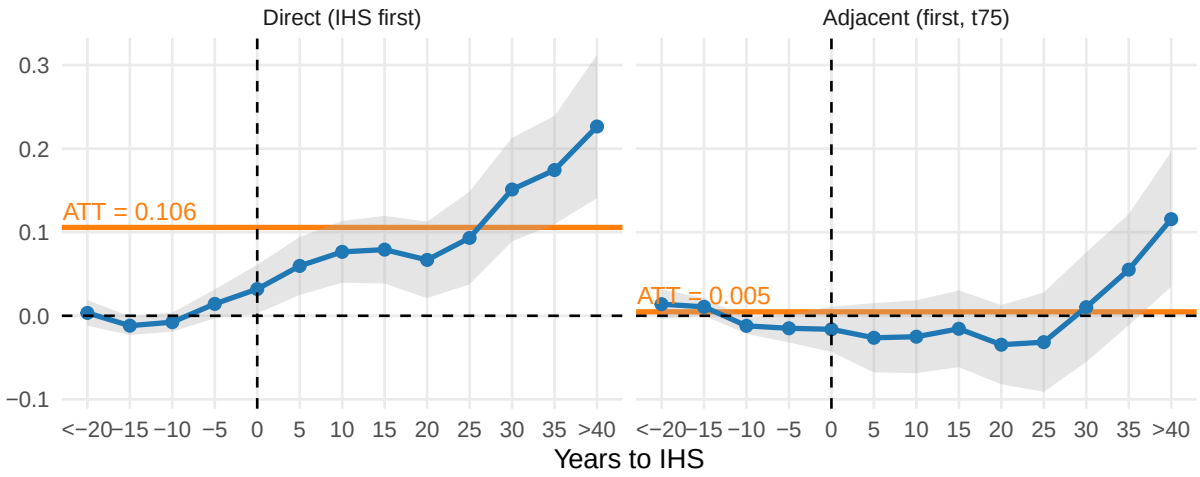
The estimates so far compare counties an Interstate crossed with counties it did not. That comparison understates the effect if highway access also reached the counties next door. Counties within reach of an IHS ramp may face lower effective transport costs, generating spillovers that operate through the same market integration mechanism at an attenuated level. Appendix Figure A13 shows that this matters in practice: by 2002, a substantial and growing share of rural counties fell within 75 kilometers of an IHS county, raising the possibility that adjacent counties in the control group are themselves partially treated. We address this by augmenting the DID2s second stage to include both the direct treatment indicator and a separate indicator for counties within 75 kilometers of a treated county, estimating the two effects jointly so that only counties in neither category serve as controls in the first stage.

With adjacent counties removed from the control group, the direct effect on farmland value per acre (ATT 0.106) is somewhat below the main specification's 0.135, while the direct decline in agricultural revenue per acre is larger (-0.161 versus -0.047; Figure 6), consistent with partially treated neighbors attenuating the main estimate. In adjacent counties the two outcomes behave differently, and the difference depends on the time window. The static-fit average effect on farmland value per acre is 0.005 in adjacent counties versus 0.106 in direct counties, indistinguishable from zero on average across the post-treatment window; the adjacent event-study profile rises late in the window, suggesting that capitalization in adjacent counties accumulates more slowly than in direct counties and may not have completed within the 1940–2002 Census panel. Agricultural revenue per acre

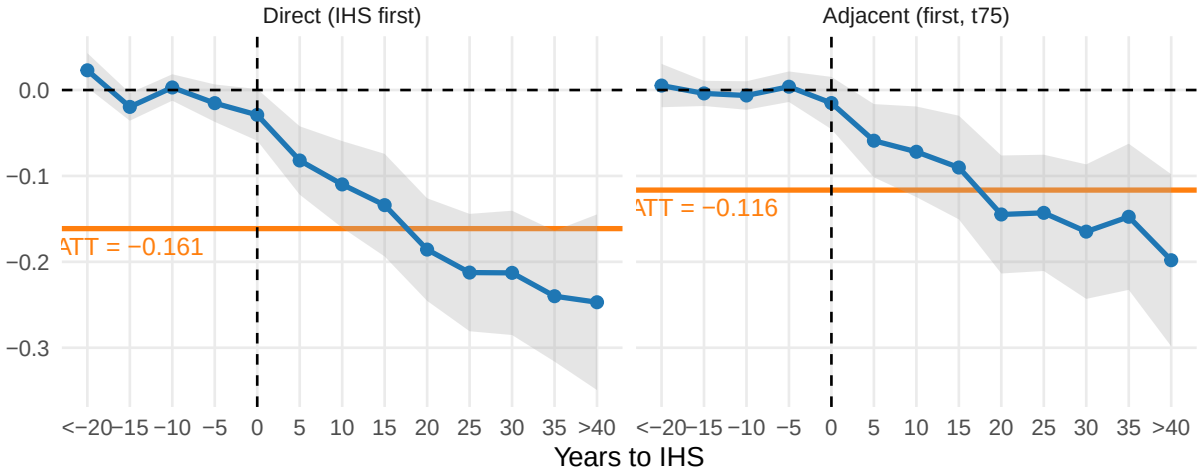
falls by 0.116 log points in adjacent counties versus 0.161 in direct counties, an adjacent effect about 70 percent of the direct magnitude that emerges earlier in the post-treatment window. The asymmetry between the static averages and the late-window capitalization profile is consistent with access being county-specific: capitalization concentrates in direct counties, while spillovers in transport costs reach revenue in adjacent counties more quickly than they capitalize into land values.

5.3 Long Difference Market Access

The designs above define treatment by whether a route crossed or came near a county, and they rely on conditional parallel trends. The long-difference design relaxes both: every county's market access changes by a different amount, and the Pershing plan provides variation in that change that does not depend on where states chose to build. Appendix Table A10 reports the first stage: lying on the 1922 Pershing plan raises the 1940–2002 change in log market access by 0.584 (standard error 0.101), about 56 percent of the estimation-sample mean change of 1.05, and the Kleibergen–Paap F-statistic ranges from 31 to 47 across both windows, the full and restricted samples, and both trade elasticities. Table 2 reports instrumental variables estimates of the long-difference specification in Equation 4, in which $\Delta \ln MA_i$ is instrumented with the 1922 Pershing plan indicator, $Pershing_i$. Panel A uses the 1940–1975 window and Panel B uses the 1940–2002 window; the Kleibergen–Paap F-statistic in these regressions is about 31 in Panel A and 33 to 34 in Panel B. All outcomes are in logs, so each coefficient is an elasticity with respect to market access. In Panel B, the elasticity of farmland value per acre with respect to market access is 0.137 (standard error 0.056), so a 10 percent increase in market access is associated with a 1.4 percent higher farmland value per acre. Because the cross-county standard deviation of $\Delta \ln MA_i$ is about 1.5, a one standard deviation increase in market access corresponds to roughly 0.21 log points higher farmland value per acre. The Panel A estimate has the same sign and is smaller, 0.095 (0.046). Both estimates are statistically significant.



(a) Farmland Value ($ per acre)



(b) Agricultural Revenue ($ per acre)

Figure 6: Spatial Spillovers: Direct and Adjacent County Effects

Notes. Each panel displays event study coefficients for directly treated counties (left) and counties within 75 km of a treated county (right), estimated jointly in the DID2s second stage. Only counties in neither category serve as controls in the first stage. Regressions control for county and year fixed effects and for 1950 measures of urban proximity, market accessibility, and prior transit infrastructure, each interacted with census year indicators. Standard errors adjusted for spatial correlation within 100 km. Shaded area is 95 percent confidence interval. Orange horizontal line marks the static-fit average ATT for each series.

The agricultural revenue outcomes do not move with farmland values. The estimates for farmland acres are negative but not statistically distinguishable from zero in either window, and the same is true of crop revenue per harvested acre, whose point estimates are positive and small. Agricultural revenue per acre is negative in both windows but is significant only in Panel B, where the estimate of -0.151 implies about 0.23 log points lower revenue per acre for a one standard deviation increase in market access; the Panel A estimate of -0.090 is not significant. Livestock revenue per acre is negative and significant in both windows, at -0.213 in Panel A and -0.263 in Panel B, or roughly 0.40 log points per standard deviation in Panel B. The number of farms over 500 acres falls with market access in both windows, by 0.226 in Panel A and 0.219 in Panel B, or roughly 0.33 log points per standard deviation, in line with the decline in large farms in the difference-in-differences estimates (Appendix Figure A10). Higher farmland values alongside lower agricultural revenue per acre are consistent with some farmland moving to non-agricultural use, which Table 3 examines directly.

Table 2: Market Access Impacts on Agriculture and Development: IV Models

	Farmland value/acre (1)	Farmland acres (2)	Ag Revenue per acre (3)	Livestock Rev. per acre (4)	Crops Rev. per harv. acre (5)	Farms over 500 Acres (6)
Panel A: 1940–1975						
$\Delta \ln MA$	0.095**	−0.034	−0.090	−0.213**	0.029	−0.226***
	(0.046)	(0.032)	(0.061)	(0.091)	(0.070)	(0.083)
KP F (Conley)	30.8	30.8	30.8	30.7	30.8	30.8
N	3039	3041	3039	3027	3027	3017
Panel B: 1940–2002						
$\Delta \ln MA$	0.137**	−0.045	−0.151**	−0.263**	0.044	−0.219**
	(0.056)	(0.034)	(0.076)	(0.108)	(0.080)	(0.092)
KP F (Conley)	33.6	33.6	33.6	33.9	34.4	33.2
N	3040	3041	3038	3014	3016	3019

Note: $\Delta \ln MA$ is instrumented with $Pershing_i$, an indicator for counties on the 1922 Pershing plan. Full sample, $\zeta = 8.22$. Conley (100 km) standard errors in parentheses; the Kleibergen–Paap F uses the Conley variance. All outcomes are in logs: farmland value per acre, farmland acres, the market value (revenue) of agricultural products per acre, of livestock per acre, and of crops per harvested acre (market values are nominal), and the number of farms over 500 acres. All regressions control for baseline county characteristics and are weighted by baseline farmland acreage, winsorized at the 99th percentile. Panel A uses the 1940–1975 window and Panel B the 1940–2002 window. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Appendix Tables A11 and A12 report the corresponding OLS estimates, on the change in log market access and on a binary indicator for Interstate access. The significant OLS estimates have the same signs as the IV estimates and are smaller, consistent with measurement error in market access attenuating the OLS estimates. The binary OLS estimates are close to the difference-in-differences results in this section: farmland value per acre rises by 0.143 and farmland acres fall by 0.039 in the 1940–2002 window. Appendix Table A13 repeats Table 2 at the lower-bound elasticity $\zeta = 3.6$. The signs and significance are unchanged, and the coefficients are larger because $\Delta \ln MA_i$ has a smaller scale at the lower elasticity.

Table 3 measures the non-agricultural margin directly. In the IV estimates (Panel A), the developed share of county land rises with market access, by 0.005 in the 1940–1975 window and 0.008 in the 1940–2002 window, or about 1.2 percentage points per standard deviation of $\Delta \ln MA_i$ over the long window. Median home values rise as well: the elasticity is 0.111 (0.054), so a one standard deviation increase in market access raises median home values by roughly 0.17 log points between 1940 and 2000. The OLS estimates in Panel B have the same signs, are smaller (0.002, 0.003, and 0.023), and are all significant at the 1 percent level. Read alongside Table 2, more development and higher housing values where market access rose suggest that highway access raised the value of land in non-agricultural use. Appendix Table A14 repeats these estimates at $\zeta = 3.6$; the signs are unchanged and every estimate remains significant at the 5 percent level or better.

6 Conclusion

Interstate Highway System access raised farmland values by about 14 percent on average, and by roughly 27 percent forty years after construction. Over the same period farmland acres fell by about 4 percent, agricultural revenue per acre by about 5 percent, and the number of farms over 500 acres by about a fifth. Land became more valuable while less

Table 3: Market Access Impacts on Development and Housing Values

Window	Dev. Land Share 1940–1975 (1)	Dev. Land Share 1940–2002 (2)	Median Home Price 1940–2000 (3)
Panel A: IV (instrument: $EverPersh$)			
$\Delta \ln MA$	0.005**	0.008***	0.111**
	(0.002)	(0.003)	(0.054)
KP F (Conley)	30.8	33.3	33.0
N	3050	3050	2989
Panel B: OLS			
$\Delta \ln MA$	0.002***	0.003***	0.023***
	(0.000)	(0.001)	(0.009)
N	3050	3050	2989

Note: Panel A reports instrumental variables estimates in which $\Delta \ln MA$ is instrumented with $Pershing_i$, an indicator for counties on the 1922 Pershing plan; Panel B reports the corresponding OLS estimates. Conley (100 km) standard errors in parentheses; the Kleibergen–Paap F uses the Conley variance. Columns (1) and (2) use the developed land share (the share of county area that is developed, in levels, from the HISDAC addendum), with endlines of 1970/75/80 for the 1940–1975 window and 1990/95/2000 for the 1940–2002 window. Column (3) is the log change in the median home value between the 1940 and 2000 NHGIS census years. $\Delta \ln MA$ is the 1940–2002 change, as in column (2). All regressions control for baseline county characteristics and are weighted by baseline farmland acreage. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

of it was farmed and the land still in farming produced less revenue per acre. That divergence is the central fact of the paper.

Development pressure accounts for much of it. The counties with the most land within reach of 1940 towns saw the largest gains in farmland value and the largest loss of farmland, about 7 percent; the same holds for counties within 50 kilometers of a 1960 metropolitan area. Where the Interstates raised market access, the developed share of county land and median home values rose as well. Within these pressured counties, value gains concentrate on the more suitable land, large farms become fewer, and the farms that remain switch from livestock to crops. Crops may explain some of the value gain near towns, but crop revenue does not make up for the lost livestock revenue, and livestock exit is what pulls aggregate revenue per acre down. One pattern remains open: the least-suitable land gains about 17 log points in value per acre even where measured pressure is zero, with no detectable change in acreage or revenue.

These results matter for how the gains from market integration are measured. Farmland values capitalize both agricultural returns and the value of land in other uses, and a parcel that converts to development leaves the Census of Agriculture, taking its new value with it. The standard farmland-value measure (Donaldson and Hornbeck, 2016) is therefore a lower bound on the gains wherever land can move out of agriculture, and our estimates locate where that omission is largest: the settled fringe near growing towns. Because the same highway sends land to development near towns while other land returns to farming elsewhere, the difference-in-differences measures the net change in acreage, which understates the gross flow of land out of agriculture.

A rough calculation gives a sense of scale. Applying our long-difference estimates to the farmland in the sample counties, valued at 2002 farmland prices in 2025 dollars, the conventional accounting based on the change in total farmland value would attribute about $256 billion to the gains from Interstate market access. That figure treats the land that left agriculture as a loss. Owners who converted land, however, chose to do so because it was worth at least as much in its new use, so the true gain should be at least $143 billion higher, before any premium for the land's new use. This is a rough comparison rather than an estimate: the acreage response is imprecisely estimated, and not every acre that left agriculture was developed. Pricing converted parcels in their new use is left to future work.

In the United States, this conversion took place alongside functioning private land markets, secure parcel-level property rights, and access to credit, which made conversion financially feasible. Across the developing world, governments and multilateral institutions have made rural transport investment a main instrument of development policy, with the stated goals of expanding market participation and raising agricultural productivity (Gorgulu et al., 2023). The World Bank alone has $33.3 billion in active transport commitments across 165 projects, approximately 10 percent of its total lending (Gonzalez-Navarro et al., 2024), and the evidence covers national highway systems

and rural road programs in China (Faber, 2014; Banerjee et al., 2020), India (Ghani et al., 2016; Asher and Novosad, 2020; Alder, 2025; Shamdasani, 2021), Indonesia (Gertler et al., 2024), Brazil (Morten and Oliveira, 2024), Ethiopia (Adamopoulos, 2025), and 39 countries in Sub-Saharan Africa (Jedwab et al., 2022). Where the outside-use channel operates, agricultural outcomes capture only part of the gains. The part they miss is concentrated where land is actively converting: the settled fringe within reach of growing towns, not the acreage far from development pressure.

How large that omission is in a developing country depends on whether the same conditions hold. Parcel-level property rights are a documented constraint: Adamopoulos et al. (2024) find that land insecurity in China was at least as large a barrier to moving out of agriculture as all other mobility frictions combined. Access to credit and the depth of land markets vary widely across and within developing economies, and road construction alone does not provide them. For these settings, we propose the analog of our exercise: stratify outcomes by land suitability and by exposure to development pressure before reading farmland values as a measure of gains, and supplement farmland measures with direct measures of the non-agricultural margin, such as land conversion rates, developed land, and housing values.

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Appendix to

"Welfare Gains from Market Integration Under Competing Land Uses"

Appendix A Supplemental Tables and Figures

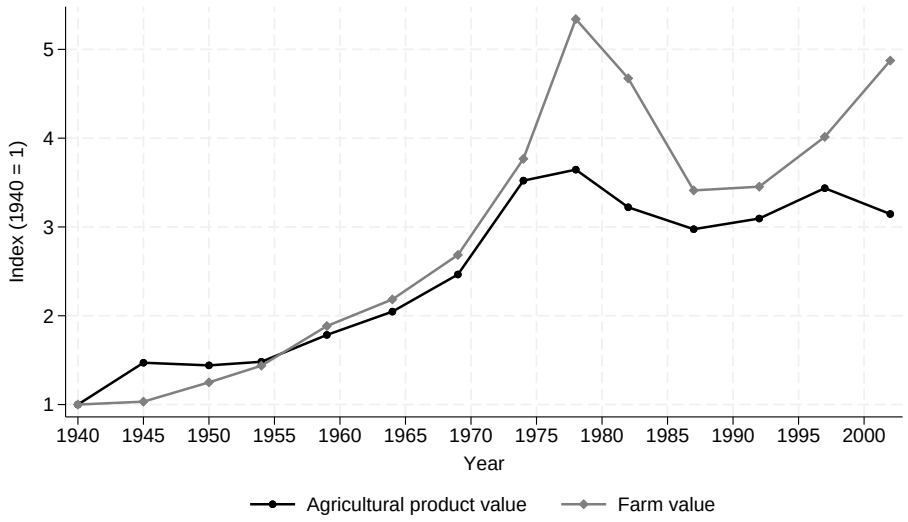


Figure A1: Farm Value per Acre and Agricultural Product Value per Acre, 1940–2002

Notes. Both series are indexed to 1940 = 1. Farm value per acre capitalizes expected future returns to agricultural production. Agricultural product value per acre measures realized revenue from crops and livestock. Values are deflated to 2025 dollars. Sample restricted to rural counties in the estimation sample.

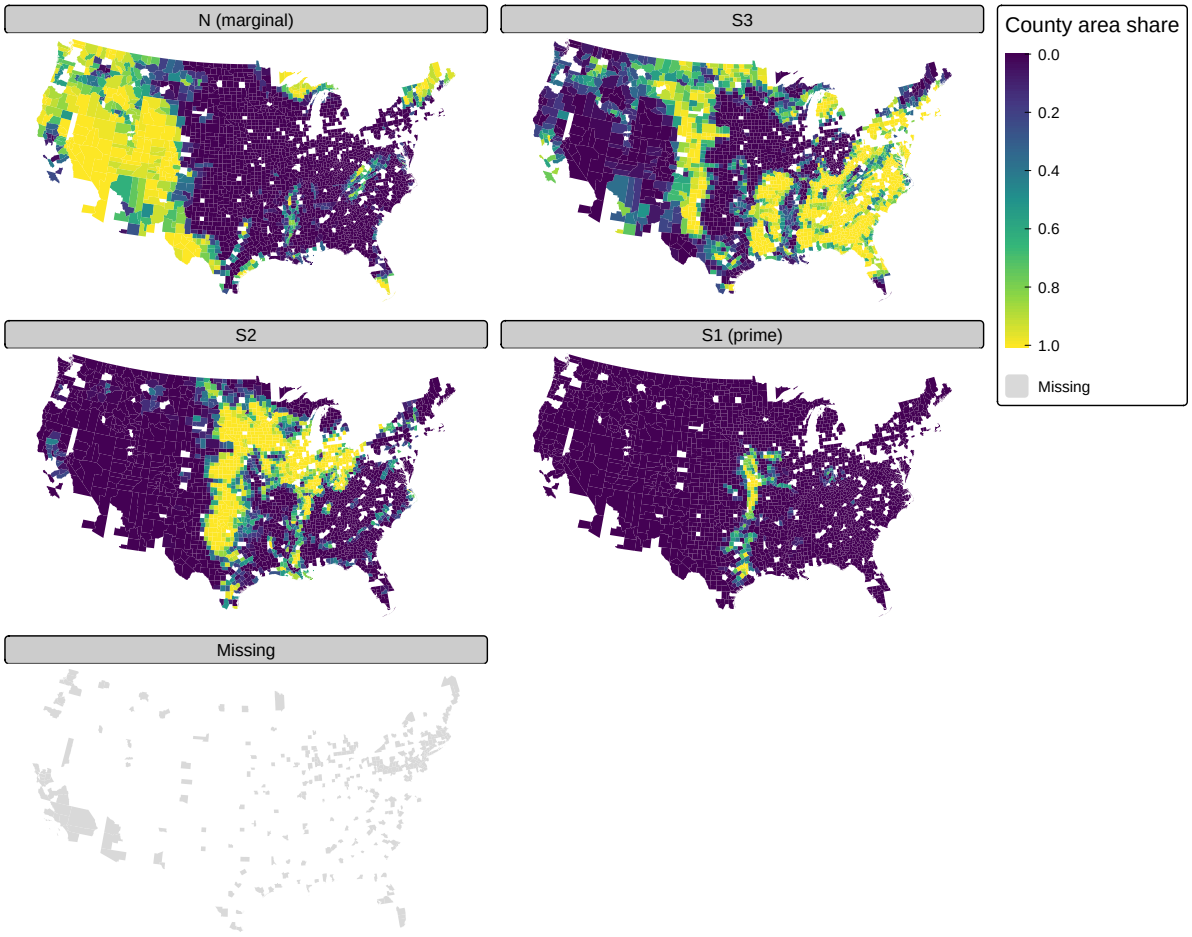


Figure A2: County Area Shares in the Four FAO Suitability Classes

Notes. Each panel maps the share of a county's area in one FAO GAEZ suitability class (N marginal, S3, S2, and S1 prime) on the rainfed low-input surface used in the appendix tables. Shares across the four classes sum to one. Analysis sample (KeepSet); excluded counties in grey.

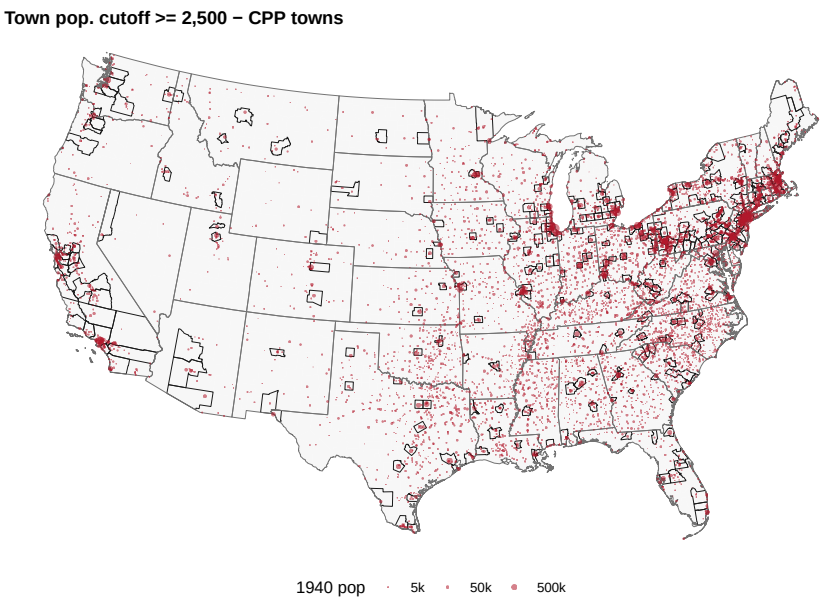


Figure A3: The 1940 Census-Place Layer Used to Seed and Validate the City Blocks

Notes. The georeferenced incorporated places of the full-count population census, sized by 1940 population; presence is read from the census rather than from the built-up raster, so the layer is complete even where the raster under-records small towns. The map shows all places, not the KeepSet-filtered analysis sample.

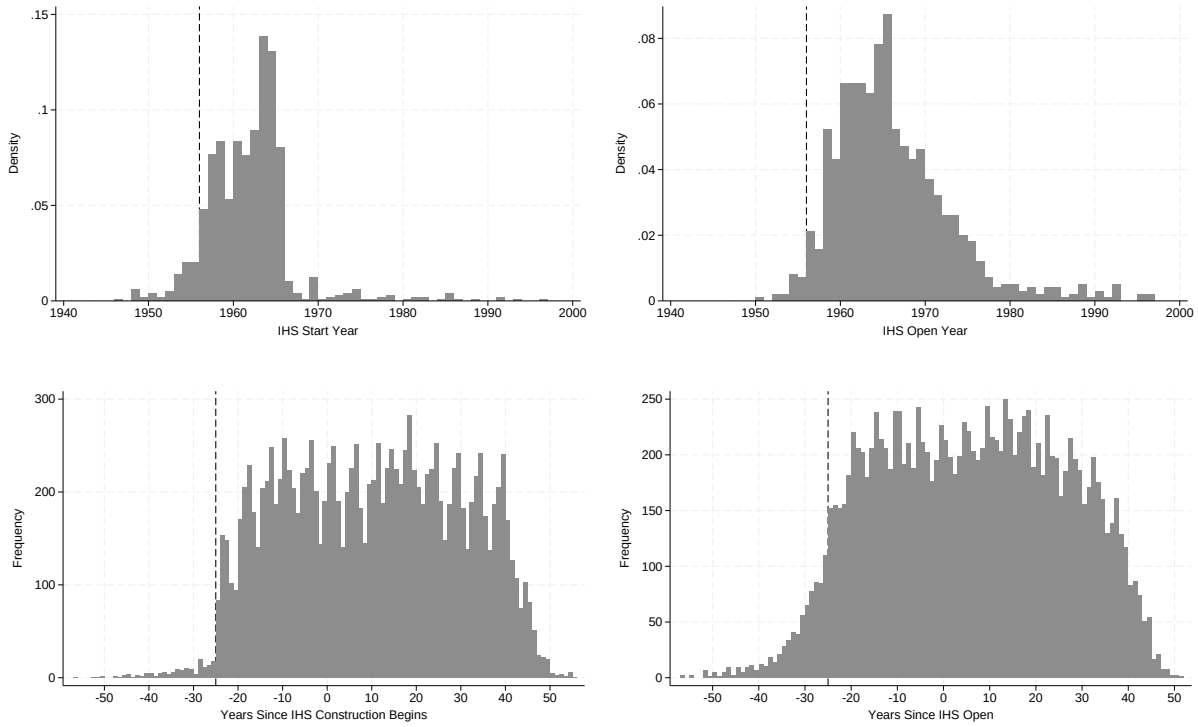
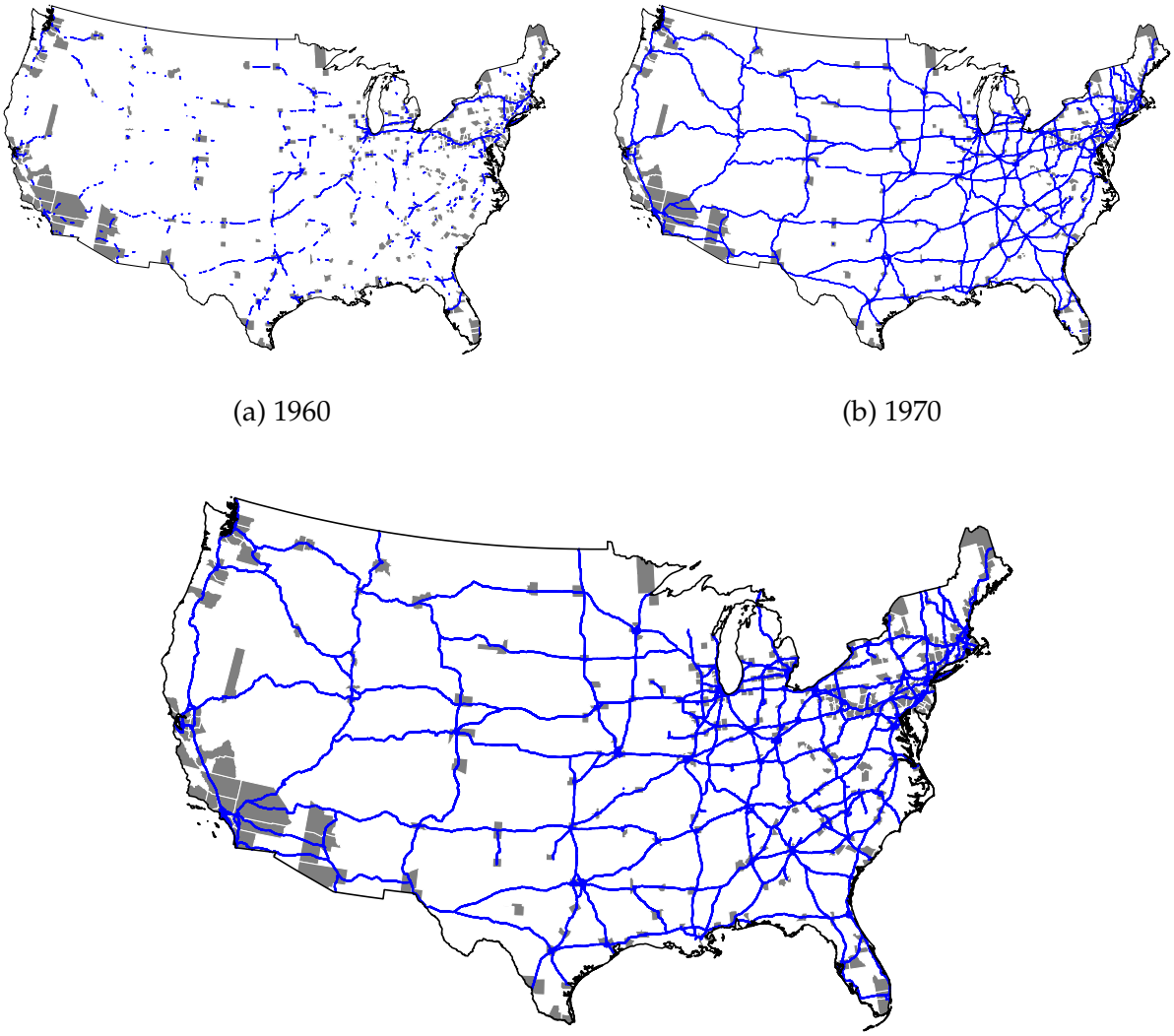


Figure A4: Distribution of IHS Construction Timing

Notes. Top panels show the distribution of groundbreaking years (left) and opening years (right) across treated counties. Bottom panels show the distribution of years elapsed since groundbreaking (left) and since opening (right) at the time of each Agricultural Census wave. The gap between groundbreaking and opening dates reflects segment construction duration, which varies with route length and terrain.



(a) 1960

(b) 1970

(c) 2002

Figure A5: Interstate Highway System Construction Progress

Notes. Figure displays the progress of IHS construction in 1960, 1970, and 2002, based on groundbreaking dates (1960, 1970) and opening dates (2002). By 1970, the majority of the eventual IHS route miles were under construction. Counties excluded from the estimation sample are shaded gray.

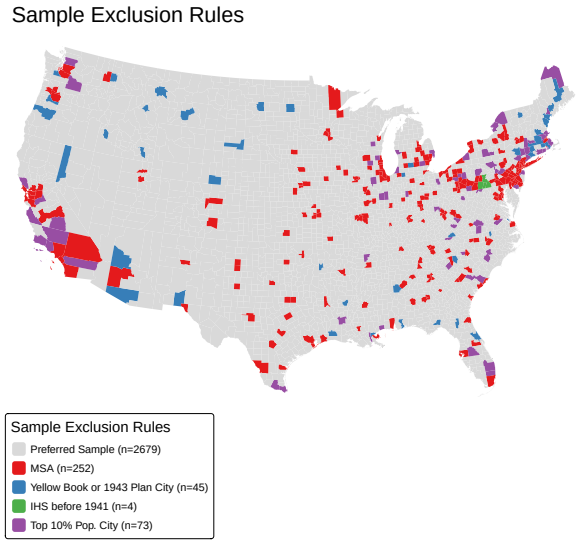


Figure A6: Counties Excluded from the Analysis

Notes. Map displays counties excluded from the main empirical analysis. Counties are excluded if they contained a Metropolitan Statistical Area in 1960, were a Yellow Book or 1943 Planned City, had an interstate before 1941, or were in the top 10 percent of counties by population.

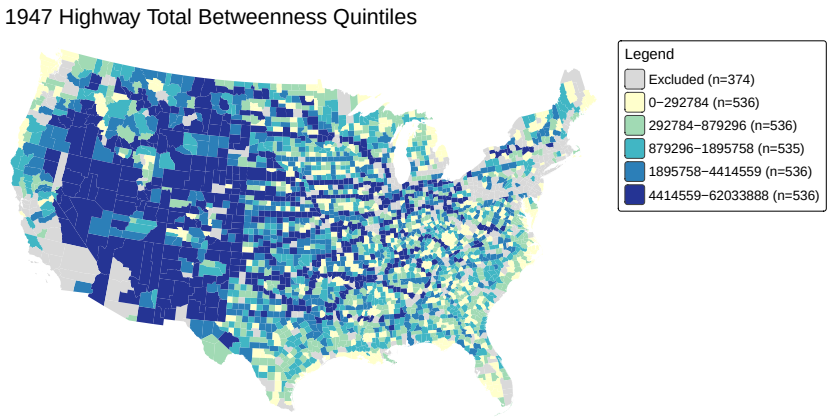


Figure A7: 1947 Highway Network Betweenness Centrality

Notes. Map displays the quintile of total betweenness centrality for each county in the 1947 Rand McNally national highway network. Counties excluded from the analysis sample are shaded gray.

Table A1: Covariates Prior to Treatment

	IHS	Non-IHS	Diff.
Panel A: Population and Urbanization			
Urban share, 1950 (%)	29.17	18.93	10.24***
	(22.28)	(21.49)	[0.87]
Population, 1950	26923.16	17344.78	9578.38***
	(18394.15)	(13430.20)	[661.17]
Population growth, 1940–1950 (%)	0.07	-0.01	0.08***
	(0.24)	(0.21)	[0.01]
Distance to nearest MSA (km)	112.85	143.41	-30.56***
	(106.96)	(117.26)	[4.39]
Panel B: Market Centrality			
Market potential, 1950	180331.31	166722.43	13608.88***
	(64988.56)	(55747.99)	[2441.81]
1947 highway betweenness centrality	4360110.34	1963691.47	2396418.87***
	(6011514.90)	(3144098.90)	[202863.62]
Panel C: Alternative Transit Infrastructure			
Railroad track (km), 1950	131.21	99.28	31.92***
	(83.39)	(74.79)	[3.18]
Distance to nearest port (km)	394.15	442.52	-48.38***
	(291.65)	(294.94)	[11.60]
Distance to nearest airport (km)	51.06	62.70	-11.64***
	(28.10)	(32.23)	[1.18]
Distance to inland waterway (km)	147.82	158.22	-10.40
	(205.56)	(204.63)	[8.13]
Panel D: Geography			
Latitude (degrees)	38.00	38.34	-0.35*
	(4.74)	(4.99)	[0.19]
Longitude (degrees)	-91.54	-92.80	1.26***
	(11.37)	(10.60)	[0.44]
County area (km^2)	2705.87	2408.03	297.84**
	(3975.56)	(2881.35)	[142.65]
Avg. elevation (m)	444.94	470.60	-25.66
	(515.38)	(525.36)	[20.56]
Terrain ruggedness (m)	76.66	71.93	4.73
	(113.32)	(108.17)	[4.41]
Observations	1,023	1,694	2,717

Notes. Means with standard deviations in parentheses. Diff. reports the treated-minus-never-treated difference with standard errors in brackets. Market potential is the Donaldson and Hornbeck (2016) county-level access measure evaluated at 1950 population weights. Highway betweenness centrality is computed from the 1947 Rand McNally national road network (Frye, 2026). Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A2: Agricultural Outcomes: Treated and Never-Treated Counties, 1950 and 2002

	Pre-IHS (1950)			Post-IHS (2002)			
	IHS	Non-IHS	Diff.	IHS	Non-IHS	Diff.	DiD
Ln(Farms)	7.26	7.06	0.20***	6.39	6.11	0.28***	0.08*
	(0.85)	(0.90)	[0.03]	(0.78)	(0.88)	[0.03]	[0.05]
Farms	1841.07	1551.94	289.13***	766.63	607.11	159.52***	-129.60***
	(1183.20)	(1074.75)	[45.28]	(524.57)	(433.22)	[19.49]	[49.30]
Farms over 500 acres	93.99	108.72	-14.73***	111.90	116.83	-4.92	9.81
	(130.35)	(151.21)	[5.49]	(101.05)	(104.34)	[4.05]	[6.82]
Shr. Farms over 500 acres	10.82	14.16	-3.34***	17.80	22.83	-5.03***	-1.69
	(18.84)	(22.08)	[0.80]	(16.63)	(19.83)	[0.71]	[1.07]
Farmland ('000 acres)	416.49	361.95	54.55***	322.63	302.37	20.26	-34.29
	(534.66)	(337.12)	[18.61]	(435.02)	(336.82)	[15.88]	[24.47]
Cropland ('000 acres)	159.15	153.76	5.38	143.53	146.62	-3.08	-8.47
	(129.73)	(137.79)	[5.26]	(143.63)	(150.70)	[5.80]	[7.83]
Shr. Harvested Acres in Top 4 Crops	0.87	0.89	-0.02***	0.93	0.94	-0.00	0.02***
	(0.13)	(0.11)	[0.00]	(0.09)	(0.10)	[0.00]	[0.01]
Farm Value p.a.	983.81	796.94	186.87***	4011.33	3019.93	991.40***	804.52***
	(710.27)	(585.75)	[26.38]	(3427.07)	(2685.51)	[126.06]	[128.79]
Mkt. Val. Agric. Products p.a.	0.28	0.23	0.05***	0.57	0.52	0.05	0.00
	(0.23)	(0.19)	[0.01]	(0.72)	(1.29)	[0.04]	[0.04]
Mkt. Val. Crops p.h.a.	0.40	0.41	-0.01	0.71	0.52	0.19***	0.20**
	(0.56)	(3.44)	[0.09]	(1.56)	(1.04)	[0.06]	[0.10]
Mkt. Val. Livestock p.p.a.	0.60	0.49	0.11***	1.95	2.54	-0.59	-0.70*
	(1.00)	(1.00)	[0.04]	(4.85)	(15.20)	[0.40]	[0.40]
Farm Labor Expend. per farm	6.76	5.98	0.79*	15.02	12.56	2.46**	1.67
	(10.30)	(10.75)	[0.41]	(28.14)	(18.13)	[0.98]	[1.07]
Shr. of Tenant Farms	0.20	0.20	0.01	0.08	0.07	0.00	-0.00
	(0.14)	(0.13)	[0.01]	(0.07)	(0.07)	[0.00]	[0.01]
Observations	1,023	1,694	2,717	1,022	1,694	2,716	5,433

Notes. Means with standard deviations in parentheses. Diff. columns report the treated-minus-never-treated difference with standard errors in brackets; DiD column reports the change in that difference from 1950 to 2002 estimated by OLS with county and year fixed effects. Monetary values are in nominal dollars per acre. Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.



(a) Farm value per acre (b) Farmland acres

Figure A8: Trends by Land Suitability, Indexed to 1940

Notes. Each panel plots the group-mean outcome indexed to 1940 = 1, separately for counties in the top 40 percent by GAEZ suitability (Suitable, black) and the bottom 60 percent (Unsuitable, gray), the coarse binary suitability split used for the aggregate-robustness battery. These are unconditional group means.

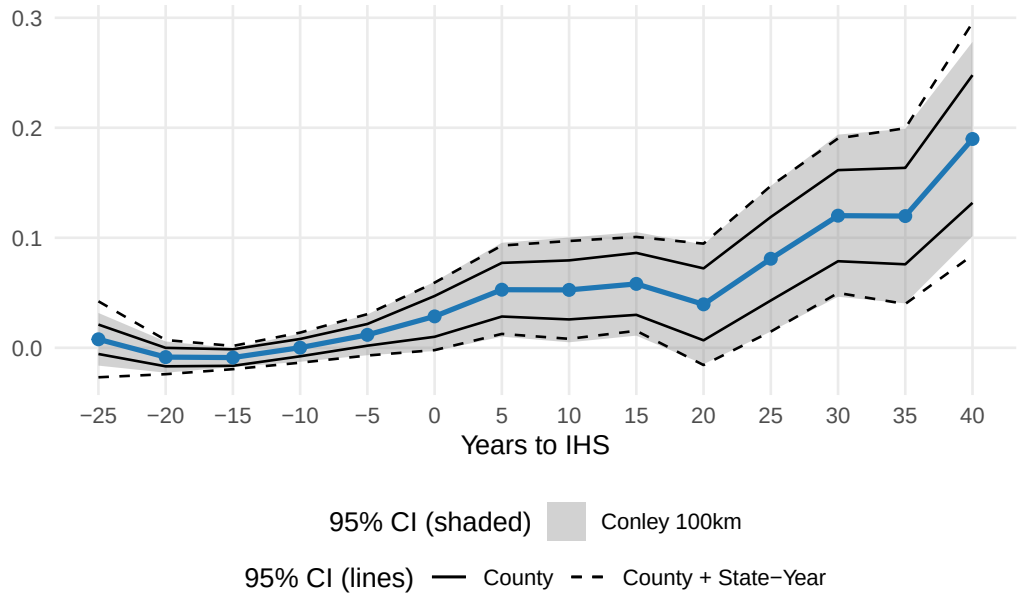
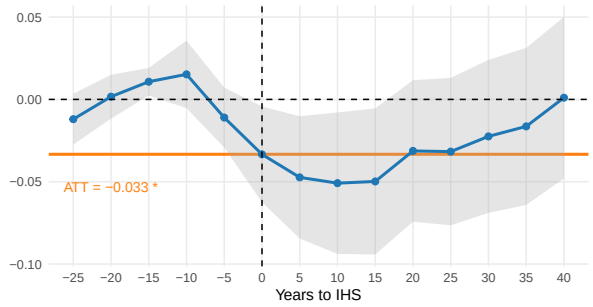
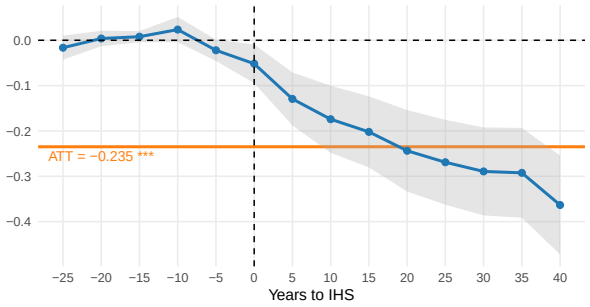


Figure A9: Interstate Highways and Farmland Values: Alternative Clustering

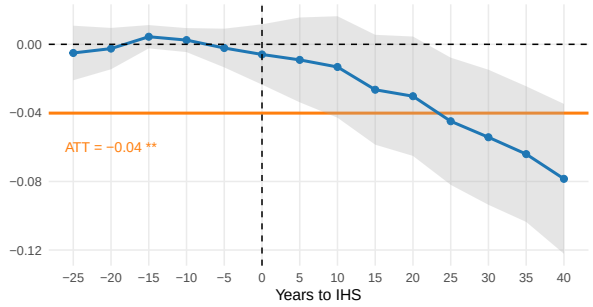
Notes. Figure displays coefficients from an event study regression estimated with `did2s`. The gray shaded area reflects 95 percent confidence intervals adjusted for spatial correlation within 100 km, identical to the preferred primary specification in Figure 3a. The solid line displays 95 percent confidence intervals with standard errors clustered at the county level. The dashed line displays 95 percent confidence intervals multi-clustered at the county and state-year levels.



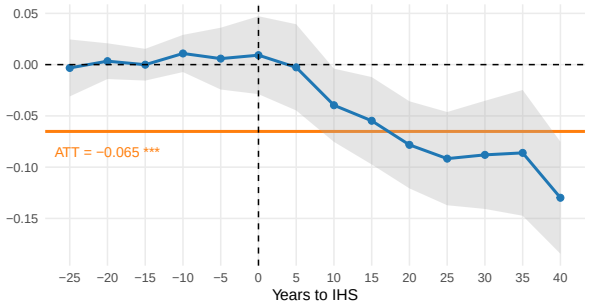
(a) Number of Farms



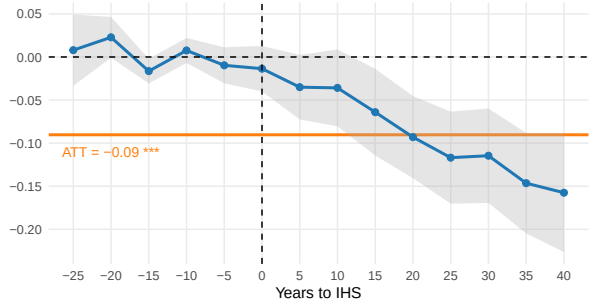
(b) Number of Farms >500 acres



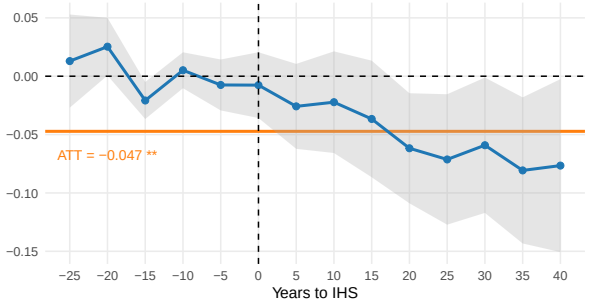
(c) Farmland Acres



(d) Cropland Acres



(e) Ag Revenue (Total $)



(f) Ag Revenue ($ Per Acre)

Figure A10: IHS Break Ground Date Event Studies

Note: Figure displays coefficients from event study regressions estimated with the two-stage difference-in-differences estimator of Gardner et al. (2024). The regressions control for county and year fixed effects and control for initial cross-sectional measures of urban proximity, market accessibility, and other transit infrastructure, multiplied by agricultural census year indicators. Standard errors are adjusted for spatial correlation within 100km. The gray area displays 95% confidence intervals. The orange line indicates the average treatment effect over all years after IHS construction; *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels.

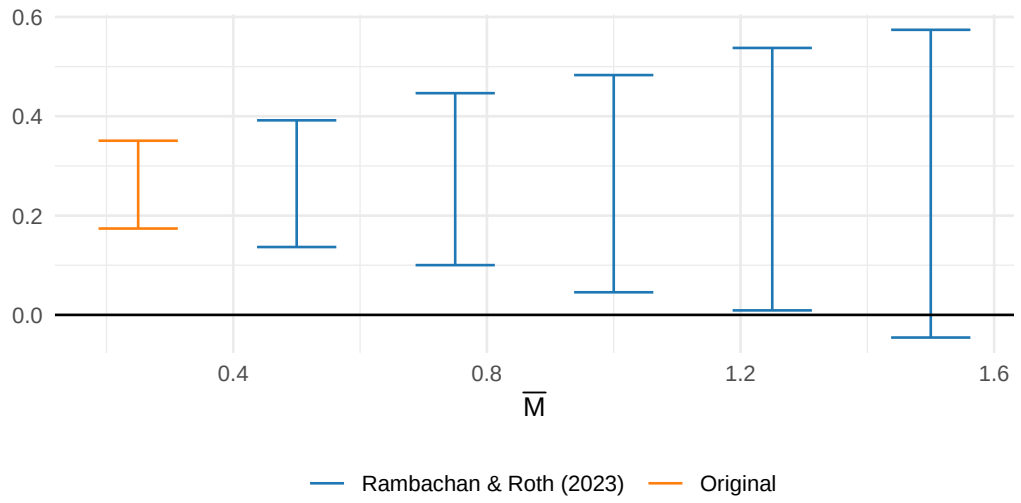
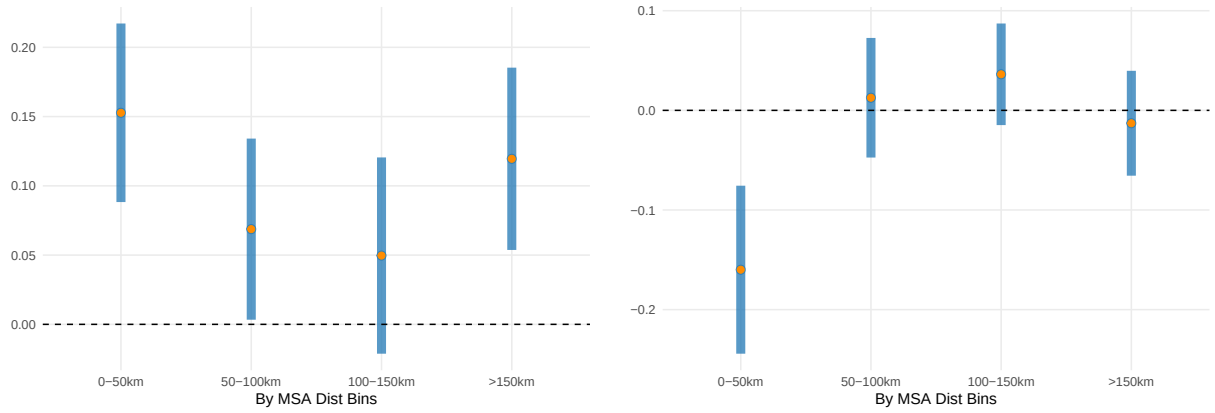


Figure A11: Rambachan and Roth (2023) Sensitivity Test on Farmland Values

Note: This figure reports sensitivity analysis following Rambachan and Roth (2023). The orange interval is the baseline 95% confidence interval for the farmland value ATT at 40 years post-treatment, estimated under the standard parallel trends assumption. The blue intervals (C-LF) show how the confidence set expands as we relax parallel trends by allowing post-treatment violations of increasing magnitude. The horizontal axis $\bar{M}$ parameterizes the maximum post-period deviation from linearity, expressed as a multiple of the largest pre-period absolute deviation observed in the event study.



(a) Farmland Value ($/acre)

(b) Farmland (acres)

Figure A12: Treatment Effect Heterogeneity by Distance to the Nearest Metropolitan Area

Notes. Figure displays heterogeneous treatment effects of IHS construction by the distance from a county to the nearest 1960 Metropolitan Statistical Area, in four bins (0–50, 50–100, 100–150, and more than 150 km). It replaces the development-pressure groups of Figure 4 with these distance bins. The dependent variables are logged farmland value per acre (Panel a) and logged farmland acres (Panel b). Regressions are estimated with the two-stage difference-in-differences estimator of Gardner et al. (2024) and include county and year fixed effects and year-interacted controls for urban proximity, market access, and prior transit infrastructure. Standard errors adjust for spatial correlation within 100 km; bars are 95 percent confidence intervals.

Table A3: Impact of IHS on Farmland Values and Farmland: Continuous Development Pressure

Panel A

	ln(Farmland Value ($/acre))					
	(1)	(2)	(3)	(4)	(5)	(6)
IHS	0.031	0.027	0.091***	0.086***	0.116***	0.114***
	(0.028)	(0.028)	(0.025)	(0.025)	(0.027)	(0.027)
IHS × Dev. Pressure	−0.060	0.063	0.079**	0.033	0.113**	−0.070
	(0.041)	(0.071)	(0.036)	(0.069)	(0.050)	(0.078)
Num.Obs.	42 441	37 853	42 441	37 853	42 440	37 852

Panel B

	ln(Farmland (acres))					
	(1)	(2)	(3)	(4)	(5)	(6)
IHS	0.078***	0.050*	0.021	0.006	−0.019	−0.022
	(0.026)	(0.026)	(0.022)	(0.021)	(0.015)	(0.015)
IHS × Dev. Pressure	−0.392***	−0.128	−0.262***	0.004	−0.118***	0.042
	(0.090)	(0.085)	(0.059)	(0.087)	(0.041)	(0.067)
Num.Obs.	42 494	37 890	42 494	37 890	42 492	37 888
Controls			✓	✓	✓	✓
Weights					✓	✓
Sample	Full	Restricted	Full	Restricted	Full	Restricted

Panel C

	ln(Total Farmland Value)					
	(1)	(2)	(3)	(4)	(5)	(6)
IHS	0.105***	0.076***	0.109***	0.091***	0.097***	0.092***
	(0.025)	(0.024)	(0.022)	(0.023)	(0.024)	(0.025)
IHS × Dev. Pressure	−0.440***	−0.067	−0.177***	0.032	−0.005	−0.030
	(0.075)	(0.058)	(0.062)	(0.056)	(0.056)	(0.056)
Num.Obs.	42 441	37 853	42 441	37 853	42 440	37 852
Controls			✓	✓	✓	✓
Weights					✓	✓
Sample	Full	Restricted	Full	Restricted	Full	Restricted

Notes. Two-stage DiD estimates (Gardner et al., 2024). Development pressure is a continuous measure of urban development in 1950. Column 1: full sample, no controls. Column 2: restricted sample, no controls. Column 3: full sample with controls. Column 4: restricted sample with controls (preferred). Column 5: Column 4 weighted by 1950 farmland area. Conley (1999) standard errors are in parentheses and adjust for spatial correlation with a 100km cutoff. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: Highway Effects by Suitability Class and Binary Development Pressure, Rainfed High-Input Surface

Dep. var. (ln):	Farmland (1)	Farms 500+ (2)	Value/acre (3)	Ag. rev./acre (4)	Lvstk. rev. (5)	Crop rev. (6)
N+S3 (marginal) × none	−0.03	−0.06*	0.15***	−0.05	−0.03	−0.10
	(0.02)	(0.04)	(0.04)	(0.04)	(0.06)	(0.07)
N+S3 (marginal) × pressure	0.03	−0.26***	0.08	0.16**	0.16	0.20**
	(0.04)	(0.06)	(0.08)	(0.06)	(0.11)	(0.10)
S2 × none	−0.04	−0.13	0.05	0.02	0.01	−0.06
	(0.03)	(0.09)	(0.05)	(0.06)	(0.10)	(0.12)
S2 × pressure	−0.02	−0.26**	0.10*	−0.15**	−0.55***	0.21*
	(0.04)	(0.11)	(0.06)	(0.06)	(0.12)	(0.11)
S1 (prime) × none	−0.03	−0.06	0.04	−0.01	0.01	−0.37**
	(0.04)	(0.11)	(0.06)	(0.05)	(0.10)	(0.15)
S1 (prime) × pressure	0.02	−0.09	0.05	−0.06	−0.29***	0.43***
	(0.04)	(0.09)	(0.04)	(0.05)	(0.10)	(0.14)

Notes. Each cell reports the IHS treatment effect from a Gardner et al. (2024) two-stage difference-in-differences on the full county panel, weighted by baseline farmland acreage (winsorized at the 99th percentile); Conley (100 km) standard errors in parentheses, applied after the two-stage estimation. Suitability uses the rainfed-high input (GAEZ) parameterization. The three classes enter as continuous county area-shares summing to one: N+S3 pools the not suitable (N) and marginally suitable (S3) land, while S2 and S1 (prime) are kept separate. Development pressure is the binary $M_c^b = \mathbf{1}\{M_c > \mathrm{med}(M_c)\}$; because M_c is zero for a majority of counties the median is zero, so "none" denotes counties with no measured pressure and "pressure" those with $M_c > 0$. The "none" row is the effect for a county fully in the class at no pressure; the "pressure" row is the additional effect under development pressure (the pressure-cell effect minus the none-cell effect), with the Conley standard error of that difference. Suitability shares interact with year in the first stage. Outcomes are in logs: farmland acres, the number of farms over 500 acres, and farmland value per acre, the market value of agricultural products per acre, of livestock per acre, and of crops per harvested acre (value outcomes in real dollars). $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A5: Full heterogeneity battery: farm survival and the extensive margin.

Dependent variable:	Farmland (1)	Cropland (2)	Harv. crop (3)	Pasture (4)	Farms 500+ (5)
Panel A: Rainfed-low suitability					
N (marginal) × none	0.17***	0.12*	0.11	0.18***	0.07
	(0.05)	(0.06)	(0.09)	(0.06)	(0.10)
N (marginal) × pressure	−0.05	−0.10	−0.03	−0.14	−0.31***
	(0.09)	(0.08)	(0.10)	(0.12)	(0.09)
S3 × none	−0.01	−0.01	−0.04	0.04	0.00
	(0.03)	(0.04)	(0.06)	(0.05)	(0.05)
S3 × pressure	−0.13***	−0.16**	−0.10*	0.01	−0.50***
	(0.05)	(0.07)	(0.08)	(0.06)	(0.08)
S2+S1 (suitable) × none	0.00	−0.02	−0.04	−0.01	−0.03
	(0.03)	(0.03)	(0.05)	(0.05)	(0.08)
S2+S1 (suitable) × pressure	0.01	0.01	0.09	−0.18***	−0.10*
	(0.03)	(0.03)	(0.04)	(0.05)	(0.07)
Panel B: Rainfed-high suitability					
N (marginal) × none	0.10***	0.07*	0.02	0.14***	0.02
	(0.03)	(0.04)	(0.06)	(0.03)	(0.06)
N (marginal) × pressure	−0.06	−0.13	−0.09	−0.15	−0.33***
	(0.06)	(0.06)	(0.08)	(0.12)	(0.10)
S3 × none	0.02	0.08	0.05	0.03	−0.04
	(0.05)	(0.06)	(0.06)	(0.07)	(0.07)
S3 × pressure	0.03	0.01	0.03	0.08	−0.27***
	(0.07)	(0.07)	(0.09)	(0.09)	(0.10)
S2+S1 (suitable) × none	−0.06	−0.08*	−0.12*	0.01	−0.11
	(0.04)	(0.04)	(0.06)	(0.05)	(0.07)
S2+S1 (suitable) × pressure	0.01	0.00	0.10	−0.07	−0.16***
	(0.05)	(0.05)	(0.07)	(0.05)	(0.09)

Notes. Each cell reports the IHS treatment effect (groundbreaking timing) from a Gardner et al. (2024) two-stage difference-in-differences on the KeepSet county panel; Conley (100 km) standard errors in parentheses. The three identification classes (N marginal, S3, and S2+S1 suitable) enter as continuous county area-shares summing to one; development pressure is the binary $M_c^b = \mathbf{1}\{M_c > \text{med}(M_c)\}$ splitting the estimation sample at the median of M_c, "none" (below median) versus "pressure" (above). The "none" row is the effect for a county fully in the class at low pressure; the "pressure" row is the additional effect under development pressure. Suitability shares interact with year in the first stage; the moderator enters only the second stage. Panels vary the GAEZ input parameterization (rainfed-low and rainfed-high). Orchard, vegetable, and perishable acreage use the pre-1978 window (1940–1974). $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A6: Full heterogeneity battery: land value and output.

Dependent variable:	Total value (1)	Value/acre (2)	Crop rev. (3)	Lvstk. rev. (4)
Panel A: Rainfed-low suitability				
N (marginal) × none	0.25***	0.09	0.12	0.28***
	(0.06)	(0.06)	(0.12)	(0.09)
N (marginal) × pressure	−0.10*	−0.06	0.16**	−0.06
	(0.08)	(0.07)	(0.12)	(0.14)
S3 × none	0.01	0.02	−0.08	−0.04
	(0.04)	(0.04)	(0.09)	(0.09)
S3 × pressure	−0.09*	0.03	0.16	−0.59***
	(0.04)	(0.05)	(0.08)	(0.13)
S2+S1 (suitable) × none	0.07	0.07*	−0.11	−0.05
	(0.04)	(0.04)	(0.09)	(0.05)
S2+S1 (suitable) × pressure	0.05***	0.04***	0.26**	−0.30***
	(0.03)	(0.03)	(0.07)	(0.06)
Panel B: Rainfed-high suitability				
N (marginal) × none	0.16***	0.06	−0.03	0.14*
	(0.04)	(0.05)	(0.09)	(0.08)
N (marginal) × pressure	0.13***	0.18***	0.12	0.17*
	(0.07)	(0.07)	(0.10)	(0.16)
S3 × none	0.10	0.09	−0.01	0.07
	(0.07)	(0.06)	(0.09)	(0.09)
S3 × pressure	0.05*	0.03	0.14	−0.05
	(0.08)	(0.08)	(0.11)	(0.12)
S2+S1 (suitable) × none	0.03	0.09**	−0.17*	−0.03
	(0.04)	(0.04)	(0.10)	(0.08)
S2+S1 (suitable) × pressure	0.03**	0.02***	0.27	−0.37***
	(0.03)	(0.04)	(0.07)	(0.07)

Notes. Each cell reports the IHS treatment effect (groundbreaking timing) from a Gardner et al. (2024) two-stage difference-in-differences on the KeepSet county panel; Conley (100 km) standard errors in parentheses. The three identification classes (N marginal, S3, and S2+S1 suitable) enter as continuous county area-shares summing to one; development pressure is the binary $M_c^b = \mathbf{1}\{M_c > \mathrm{med}(M_c)\}$ splitting the estimation sample at the median of M_c, "none" (below median) versus "pressure" (above). The "none" row is the effect for a county fully in the class at low pressure; the "pressure" row is the additional effect under development pressure. Suitability shares interact with year in the first stage; the moderator enters only the second stage. Panels vary the GAEZ input parameterization (rainfed-low and rainfed-high). Orchard, vegetable, and perishable acreage use the pre-1978 window (1940–1974). $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A7: Full heterogeneity battery: within-agriculture composition.

Dependent variable:	Cattle (1)	Top4 harv (2)	Top4 tot (3)	Orchard (4)	Veg. (5)	Perish. (6)	Tenant sh (7)
Panel A: Rainfed-low suitability							
N (marginal) × none	0.32***	−0.01	0.00	0.52**	0.83***	0.69***	0.01
	(0.07)	(0.02)	(0.01)	(0.26)	(0.24)	(0.22)	(0.01)
N (marginal) × pressure	−0.10**	−0.02	−0.02	−0.85	−0.65	−1.31**	0.01
	(0.11)	(0.02)	(0.01)	(0.32)	(0.29)	(0.26)	(0.02)
S3 × none	0.04	0.01	0.00	−0.07	−0.12	−0.09	0.00
	(0.05)	(0.01)	(0.01)	(0.09)	(0.11)	(0.08)	(0.01)
S3 × pressure	−0.23***	0.00	0.00	0.06	0.11	−0.06	0.06***
	(0.06)	(0.01)	(0.01)	(0.11)	(0.12)	(0.10)	(0.02)
S2+S1 (suitable) × none	−0.07	0.00	0.01	0.03	−0.11	−0.02	−0.02*
	(0.06)	(0.01)	(0.01)	(0.11)	(0.14)	(0.12)	(0.01)
S2+S1 (suitable) × pressure	−0.22***	0.03***	−0.01	−0.07	0.34*	0.04	0.05***
	(0.06)	(0.01)	(0.01)	(0.09)	(0.12)	(0.09)	(0.01)
Panel B: Rainfed-high suitability							
N (marginal) × none	0.14**	−0.02	0.00	0.33	0.50**	0.37**	0.02**
	(0.06)	(0.01)	(0.01)	(0.22)	(0.20)	(0.18)	(0.01)
N (marginal) × pressure	−0.05	0.00	−0.01	−0.73	−0.26	−0.82**	0.00
	(0.12)	(0.02)	(0.01)	(0.28)	(0.24)	(0.21)	(0.01)
S3 × none	0.10	0.03	0.00	0.16	0.00	0.10	0.01
	(0.08)	(0.02)	(0.01)	(0.17)	(0.16)	(0.14)	(0.01)
S3 × pressure	0.04*	0.00	−0.01	−0.14	−0.14	−0.21	0.03***
	(0.08)	(0.02)	(0.02)	(0.19)	(0.22)	(0.21)	(0.01)
S2+S1 (suitable) × none	0.02	0.00	0.00	−0.10	−0.08	−0.08	−0.01
	(0.05)	(0.01)	(0.01)	(0.08)	(0.10)	(0.09)	(0.01)
S2+S1 (suitable) × pressure	−0.25***	0.01**	0.00	0.07	0.22	0.01	0.04***
	(0.05)	(0.01)	(0.01)	(0.08)	(0.09)	(0.08)	(0.01)

Notes. Each cell reports the IHS treatment effect (groundbreaking timing) from a Gardner et al. (2024) two-stage difference-in-differences on the KeepSet county panel; Conley (100 km) standard errors in parentheses. The three identification classes (N marginal, S3, and S2+S1 suitable) enter as continuous county area-shares summing to one; development pressure is the binary $M_c^b = \mathbf{1}\{M_c > \mathrm{med}(M_c)\}$ splitting the estimation sample at the median of M_c, "none" (below median) versus "pressure" (above). The "none" row is the effect for a county fully in the class at low pressure; the "pressure" row is the additional effect under development pressure. Suitability shares interact with year in the first stage; the moderator enters only the second stage. Panels vary the GAEZ input parameterization (rainfed-low and rainfed-high). Orchard, vegetable, and perishable acreage use the pre-1978 window (1940–1974). $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A8: Impact of IHS on Farmland Values: Heterogeneity

	log(Farmland Value)			
	(1)	(2)	(3)	(4)
IHS × N (not suitable)	0.111**	0.047	−0.076	0.065
	(0.053)	(0.084)	(0.072)	(0.056)
IHS × S3	−0.024	0.062	0.067	0.086
	(0.040)	(0.058)	(0.057)	(0.089)
IHS × S2S1 (suitable)	0.114***	0.094**	0.094**	0.013
	(0.043)	(0.047)	(0.041)	(0.037)
IHS × N (not suitable) × Suburb	−0.040			
	(0.080)			
IHS × S3 × Suburb	0.135**			
	(0.060)			
IHS × S2S1 (suitable) × Suburb	0.061*			
	(0.032)			
IHS × N (not suitable) × High Other Roads		0.095*		
		(0.055)		
IHS × S3 × High Other Roads		0.047		
		(0.039)		
IHS × S2S1 (suitable) × High Other Roads		0.077**		
		(0.031)		
IHS × N (not suitable) × High Rail			0.166***	
			(0.051)	
IHS × S3 × High Rail			0.040	
			(0.038)	
IHS × S2S1 (suitable) × High Rail			0.074**	
			(0.032)	
IHS × N (not suitable) × Waterway				0.113
				(0.095)
IHS × S3 × Waterway				0.034
				(0.037)
IHS × S2S1 (suitable) × Waterway				0.139***
				(0.040)
Num.Obs.	37 852	37 852	37 852	37 852

Notes. Two-stage DiD estimates (Gardner et al., 2024) interacting the IHS treatment with the county's FAO suitability-class shares (marginal N, S3, and suitable S2+S1) and, in turn, with four proximity and pre-existing-transit dimensions, one per column. Metropolitan proximity is defined as a county centroid within 75 km of a 1960 Metropolitan Statistical Area centroid. Other Roads is an indicator for above-median 1947 highway betweenness. Rail is an indicator for above-median railroad density. Waterway is an indicator for a county centroid within 75 km of a navigable waterway. All specifications include county and year fixed effects and the full control vector interacted with year indicators. Conley (1999) standard errors in parentheses, 100 km cutoff. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A9: Impact of IHS on Farmland Acres: Heterogeneity by Suitability

	log(Farmland)			
	(1)	(2)	(3)	(4)
IHS × N (not suitable)	0.170***	0.010	0.177**	0.251***
	(0.051)	(0.098)	(0.083)	(0.048)
IHS × S3	0.017	−0.064	−0.059	−0.064
	(0.030)	(0.044)	(0.049)	(0.076)
IHS × S2S1 (suitable)	−0.023	0.050*	−0.001	0.031
	(0.025)	(0.025)	(0.027)	(0.030)
IHS × N (not suitable) × Suburb	0.214**			
	(0.091)			
IHS × S3 × Suburb	−0.105*			
	(0.059)			
IHS × S2S1 (suitable) × Suburb	0.066**			
	(0.028)			
IHS × N (not suitable) × High Other Roads		0.250***		
		(0.044)		
IHS × S3 × High Other Roads		−0.027		
		(0.041)		
IHS × S2S1 (suitable) × High Other Roads		0.026		
		(0.026)		
IHS × N (not suitable) × High Rail			0.183***	
			(0.049)	
IHS × S3 × High Rail			−0.021	
			(0.034)	
IHS × S2S1 (suitable) × High Rail			0.046*	
			(0.026)	
IHS × N (not suitable) × Waterway				0.005
				(0.097)
IHS × S3 × Waterway				−0.027
				(0.035)
IHS × S2S1 (suitable) × Waterway				0.034
				(0.030)
Num.Obs.	37 888	37 888	37 888	37 888

Notes. As in Table A8, for log farmland acres: the IHS treatment interacted with the FAO suitability-class shares (marginal N, S3, and suitable S2+S1) and with each of the four proximity and pre-existing-transit dimensions, one per column. Heterogeneity indicators defined as in Table A8. Conley (1999) standard errors in parentheses, 100 km cutoff. $^{*}\,p < 0.10$, $^{**}\,p < 0.05$, $^{***}\,p < 0.01$.

Table A10: First-Stage Estimates: Change in Log Market Access on the Pershing Instrument

	$\zeta = 8.22$		$\zeta = 3.6$	
	(1)	(2)	(3)	(4)
Sample	Full	KeepSet	Full	KeepSet
Panel A: 1940–1975				
$Pershing_i$	0.518***	0.555***	0.186***	0.197***
	(0.093)	(0.094)	(0.030)	(0.029)
KP F (Conley)	30.8	34.7	39.6	45.9
AP F (heteroskedasticity-robust)	60.0	63.7	83.0	87.8
AP F (conventional)	119.5	131.5	137.6	149.1
Partial R^2	0.038	0.046	0.043	0.052
Mean $\Delta \ln MA$	0.835	0.740	0.616	0.586
N	3050	2715	3050	2715
Panel B: 1940–2002				
$Pershing_i$	0.584***	0.620***	0.205***	0.217***
	(0.101)	(0.103)	(0.032)	(0.032)
KP F (Conley)	33.3	36.4	42.3	46.8
AP F (heteroskedasticity-robust)	61.2	63.6	80.9	83.4
AP F (conventional)	118.7	126.0	135.1	142.0
Partial R^2	0.038	0.044	0.043	0.050
Mean $\Delta \ln MA$	1.051	0.937	0.776	0.741
N	3050	2715	3050	2715

Note: Each column regresses $\Delta \ln MA$ on $Pershing_i$, an indicator for counties on the 1922 Pershing plan, controlling for baseline county characteristics and weighting by baseline farmland acreage, winsorized at the 99th percentile. Conley (100 km) standard errors in parentheses. KP F is the Kleibergen–Paap statistic using the Conley variance; with one endogenous regressor and one instrument it equals the Angrist–Pischke conditional F under that variance. The two AP F rows report the same statistic under a heteroskedasticity-robust and a conventional (homoskedastic) variance. Partial R^2 is the weighted squared correlation between $\Delta \ln MA$ and $Pershing_i$ after partialling out the controls. The sample is all counties with a market access change and a positive baseline farmland weight; the outcome-specific second-stage samples are slightly smaller. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A11: Market Access Impacts on Agriculture and Development: OLS Models, Change in Log Market Access

	Farmland value/acre (1)	Farmland acres (2)	Ag Revenue per acre (3)	Livestock Rev. per acre (4)	Crops Rev. per harv. acre (5)	Farms over 500 Acres (6)
Panel A: 1940–1975						
$\Delta \ln MA$	0.015**	−0.001	−0.002	−0.008	−0.008	−0.011
	(0.008)	(0.006)	(0.013)	(0.017)	(0.014)	(0.014)
N	3039	3041	3039	3027	3027	3017
Panel B: 1940–2002						
$\Delta \ln MA$	0.029***	−0.006	−0.017	−0.042**	0.005	−0.015
	(0.010)	(0.007)	(0.013)	(0.019)	(0.016)	(0.017)
N	3040	3041	3038	3014	3016	3019

Note: OLS estimates of the coefficient on $\Delta \ln MA$, with the same specification as Table 2 but without instrumenting. Full sample, $\zeta = 8.22$. Conley (100 km) standard errors in parentheses. All outcomes are in logs: farmland value per acre, farmland acres, the market value (revenue) of agricultural products per acre, of livestock per acre, and of crops per harvested acre (market values are nominal), and the number of farms over 500 acres. All regressions control for baseline county characteristics and are weighted by baseline farmland acreage, winsorized at the 99th percentile. Panel A uses the 1940–1975 window and Panel B the 1940–2002 window. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A12: Highway Impacts on Agriculture and Development: OLS Models, Binary Interstate Treatment

	Farmland value/acre (1)	Farmland acres (2)	Ag Revenue per acre (3)	Livestock Rev. per acre (4)	Crops Rev. per harv. acre (5)	Farms over 500 Acres (6)
Panel A: 1940–1975						
Δ IHS	0.070***	−0.015	−0.039	−0.015	−0.058	−0.092**
	(0.022)	(0.016)	(0.029)	(0.039)	(0.041)	(0.037)
N	3039	3041	3039	3027	3027	3017
Panel B: 1940–2002						
Δ IHS	0.143***	−0.039*	−0.078*	−0.121**	−0.040	−0.097**
	(0.034)	(0.021)	(0.042)	(0.058)	(0.053)	(0.047)
N	3040	3041	3038	3014	3016	3019

Note: OLS estimates of the coefficient on Δ IHS, the change in the share of endline years in which a county has an Interstate (break-ground date, smoothed) relative to the baseline value of zero. Same endpoints, controls, weights, and Conley (100 km) standard errors as Table 2. Outcomes are as in the notes to Table A11. Full sample. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A13: Market Access Impacts on Agriculture and Development: IV Models, Lower-Bound Elasticity ($\zeta = 3.6$)

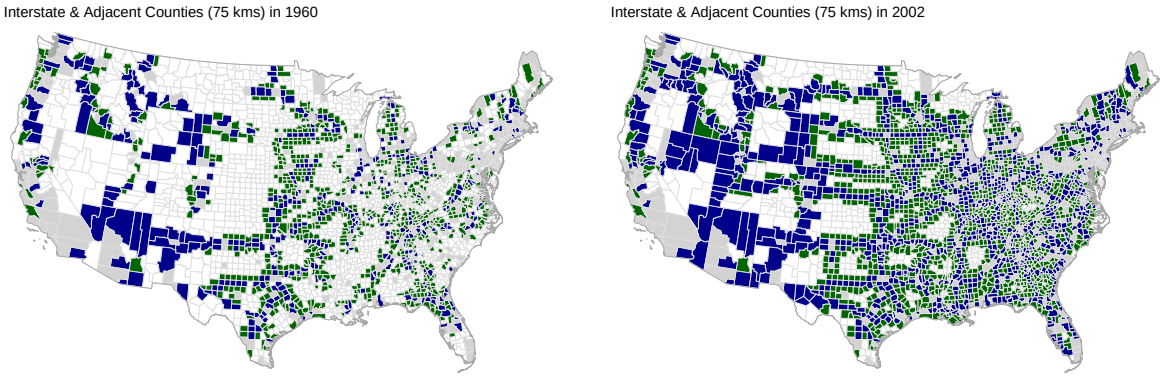
	Farmland value/acre (1)	Farmland acres (2)	Ag Revenue per acre (3)	Livestock Rev. per acre (4)	Crops Rev. per harv. acre (5)	Farms over 500 Acres (6)
Panel A: 1940–1975						
$\Delta \ln MA$	0.265**	−0.094	−0.251	−0.593**	0.080	−0.631***
	(0.128)	(0.088)	(0.166)	(0.241)	(0.195)	(0.222)
KP F (Conley)	39.7	39.7	39.7	39.6	39.7	39.7
N	3039	3041	3039	3027	3027	3017
Panel B: 1940–2002						
$\Delta \ln MA$	0.389**	−0.129	−0.430**	−0.755**	0.128	−0.623**
	(0.154)	(0.095)	(0.212)	(0.298)	(0.228)	(0.256)
KP F (Conley)	42.8	42.8	42.8	42.4	42.7	42.3
N	3040	3041	3038	3014	3016	3019

Note: Same specification as Table 2 with the lower-bound trade elasticity $\zeta = 3.6$ in the market access measure. $\Delta \ln MA$ is instrumented with $Pershing_i$, an indicator for counties on the 1922 Pershing plan. Full sample. Conley (100 km) standard errors in parentheses; the Kleibergen–Paap F uses the Conley variance. All outcomes are in logs: farmland value per acre, farmland acres, the market value (revenue) of agricultural products per acre, of livestock per acre, and of crops per harvested acre (market values are nominal), and the number of farms over 500 acres. All regressions control for baseline county characteristics and are weighted by baseline farmland acreage, winsorized at the 99th percentile. Panel A uses the 1940–1975 window and Panel B the 1940–2002 window. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A14: Market Access Impacts on Development and Housing Values: Lower-Bound Elasticity ($\zeta = 3.6$)

Window	Dev. Land Share 1940–1975 (1)	Dev. Land Share 1940–2002 (2)	Median Home Price 1940–2000 (3)
Panel A: IV (instrument: $EverPersh$)			
$\Delta \ln MA$	0.013**	0.022***	0.313**
	(0.005)	(0.008)	(0.149)
KP F (Conley)	39.6	42.3	42.6
N	3050	3050	2989
Panel B: OLS			
$\Delta \ln MA$	0.005***	0.009***	0.070**
	(0.001)	(0.003)	(0.029)
N	3050	3050	2989

Note: Same specification as Table 3 with the lower-bound trade elasticity $\zeta = 3.6$ in the market access measure. Panel A reports instrumental variables estimates in which $\Delta \ln MA$ is instrumented with $Pershing_i$ ($EverPersh$ in the panel heading); Panel B reports the corresponding OLS estimates. Columns (1) and (2) use the developed land share in levels, from the HISDAC addendum; column (3) is the log change in the median home value between 1940 and 2000. Full sample. Conley (100 km) standard errors in parentheses; the Kleibergen–Paap F uses the Conley variance. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.



(a) 1960 (b) 2002

Figure A13: Interstate Highway Counties and Adjacent Counties within 75 km

Notes. Maps display counties that IHS segments intersect (dark blue) and counties within 75 km of an IHS county (light blue) in 1960 and 2002. Treatment timing is defined by the break-ground date. Counties excluded from the sample are shaded gray.