# Potato to the Rescue: Home Production and Child Health during Severe Economic Crises*

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**Abstract**

Severe economic crises undermine food security and child health, yet households may adopt coping strategies that partially offset these shocks. Using individual-level data from post-Soviet countries in the 1990s, this paper shows that home production of potatoes on agroecologically suitable land mitigated the adverse effects of crisis exposure on child health. This finding is robust to controlling for individual heterogeneity, local shocks, and occupation-specific trends. The effect is specific to potatoes, concentrated among cohorts exposed in early childhood, and confined to the crisis period. We provide evidence that it operates primarily through direct consumption of potatoes rather than through income generation, food substitution, or barter and exchange. The findings suggest that subsistence production of staple crops can help sustain child health during acute economic disruptions when access to food markets and public support deteriorates.

**Keywords**: Economic crises, Child health, Household coping strategies, Subsistence agriculture, Home food production, Soil suitability.

**JEL**: I15, Q12, O12, P36.

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*"How do you manage to survive now?"*

*"We survive on potatoes."*

— Russian households during the 1990s transition crisis (Ries, 2009)

# 1 Introduction

Severe economic crises undermine food security and pose serious risks to child health, with potentially persistent consequences for human capital formation. A large literature documents the adverse health effects of income shocks and economic disruptions, particularly for children exposed early in life (Case & Paxson, 2008; Victora et al., 2008; Maluccio et al., 2009; Currie & Almond, 2011; Van den Berg et al., 2016). Yet, despite this evidence, we know relatively little about the household-level coping strategies that can buffer children against nutritional deprivation during such episodes—and whether these strategies remain effective beyond the short run.

This paper studies one such strategy: agricultural home production. Specifically, we examine whether household cultivation of potatoes helped protect child health during a severe economic crisis, and under what conditions this strategy was effective. Our setting is the post-Soviet transition of the 1990s, a period marked by sharp declines in real incomes, the erosion of savings, and a sudden deterioration in households' access to food markets. Using newly matched household survey data and high-resolution agroecological information from Russia, Kazakhstan, and other post-Soviet countries, we show that home production of potatoes—particularly in areas naturally suited for their cultivation—substantially mitigated the negative health effects of crisis exposure among young children.

The post-Soviet transition provides a useful laboratory for studying household resilience under extreme economic disruption. In the early 1990s, countries such as Russia and Kazakhstan experienced monthly inflation averaging over 20 percent, real wage declines of 40–60 percent, and sharp contractions in household consumption (Blanchard & Kremer, 1997; Milanovic, 1998; Svejnar, 2002). At the same time, access to formal food markets deteriorated markedly, especially for households with limited purchasing power or geographic access. These conditions generated acute nutritional stress, particularly for children in early life, and mirror key features of contemporary

crises driven by conflict, inflation, or climate shocks (De Winne & Peersman, 2021; Bogmans et al., 2021; Artuc et al., 2022).

Our empirical analysis proceeds in three steps. First, we provide suggestive cross-country evidence using the 2016 Life in Transition Survey (LiTS), which covers individuals in 14 post-Soviet countries. We compare adult height outcomes of individuals who were age five or younger during their country's transition year to those of older cohorts. We show that early-life exposure to the transition is associated with a negative height gap of 1.4–1.6 cm in adulthood, consistent with existing evidence (Adserà et al., 2021). Importantly, we find that this height gap is substantially smaller in absolute value in locations with higher soil suitability for potato cultivation: at the sample mean of the suitability index, the implied gap shrinks to approximately 0.4 cm.

Second, we turn to household-level panel data from Russia drawn from the Russian Longitudinal Monitoring Survey (RLMS), which allows us to observe children and households repeatedly throughout the most acute phase of the crisis (1994–2001) and to follow exposed cohorts into adulthood. These data reveal strong negative selection into growing potato: during the crisis years, children in potato-growing households are, on average, about 0.5 standard deviations shorter in height-for-age than children in non-growing households, corresponding to a negative height gap of roughly 2.75 cm. Crucially, this gap narrows sharply with agroecological soil suitability for growing potatoes. For households located on land with average potato soil suitability, the estimated gap falls to about 0.3 cm relative to households cultivating potatoes on unsuitable land. These buffering effects persist into adulthood: among cohorts exposed to the crisis in early childhood, adult height outcomes improve significantly when potato cultivation occurred under favorable agroecological conditions.

Third, we provide causal evidence by exploiting within-country variation in agroecological soil suitability to isolate the nutritional role of potato cultivation. Using the RLMS data and exploiting the soil suitability index as an instrument for potato cultivation, we find that a one-standard-deviation increase in local suitability raises the probability of cultivation by nearly 19 percentage points and increases children's height-for-age z-scores by about 0.33 standard deviations—roughly one quarter of the overall variation in child height. To assess the external validity

of these findings, we replicate the analysis using cross-sectional data from the Kazakhstan Living Standards Measurement Survey (KLSMS). In this setting, detailed geographic information allows us to implement a similar instrumental-variables strategy using soil suitability as an instrument for household potato production. The results confirm a strong first stage and yield similarly large local average treatment effects, reinforcing a causal interpretation of the buffering mechanism identified in Russia.

We subject our baseline results to an extensive set of robustness exercises designed to address concerns about identification, selection, and confounding regional trends. Our estimates remain stable when controlling for a rich set of fixed effects, including individual fixed effects, region*year fixed effects (or region-specific linear time trends), and job occupation*year fixed effects for household heads, which absorb differential exposure to labor market shocks during the crisis. We further show that the results are not driven by differences across regions: potato suitability is uncorrelated with household income, expenditures, savings, poverty status, wages, or employment in the public sector, both before and during the transition. Importantly, the buffering effect of potato cultivation is confined to cohorts exposed in early childhood and disappears for children born after the most acute phase of the crisis, even in highly suitable areas. This cohort-specific timing strongly supports a causal interpretation tied to crisis exposure rather than persistent regional advantages.

We complement these robustness checks with a series of placebo and falsification exercises. First, we show that cultivating potatoes outside the crisis period does not yield comparable health benefits, indicating that home production matters specifically when market access and purchasing power collapse. Second, we implement placebo tests by replacing potato cultivation with the cultivation of other commonly grown vegetables (cabbage, tomatoes, beets, and carrots) and livestock (cows, pigs, sheep and goats, poultry) and find no analogous effects on child health. Third, we conduct placebo tests using household economic variables, including income, expenditures, and savings, and find no systematic relationship between these outcomes and the interaction of potato cultivation with soil suitability. Together, these exercises rule out alternative explanations based on income effects, generalized agricultural activity, or unobserved regional characteristics.

Finally, we explicitly investigate the mechanisms through which potato cultivation mitigated

the adverse health effects of crisis exposure. In principle, home production could improve child health through several channels: direct consumption, income generation, substitution toward other foods, or barter and exchange. Our analysis provides strong evidence that the buffering effect operates through direct consumption of home-grown potatoes. Using detailed household data from the RLMS, we show that potato-growing households did not experience higher total income, expenditures, or savings, nor did they increase spending on other food categories during the crisis. We also find no evidence that potatoes were systematically sold or exchanged for other goods. Instead, potato cultivation is associated with higher household availability and consumption of staple calories, consistent with a direct nutritional channel. These findings explain why similar effects are not observed for other home-grown crops and rule out income, substitution, and exchange mechanisms.

Our analysis contributes to several strands of literature. First, we add to the literature on the health consequences of large economic shocks and early-life deprivation (Handa & King, 2003; Deaton, 2007; Bozzoli et al., 2009; Van den Berg et al., 2016; Bailey et al., 2018) by identifying a household-level coping strategy that can meaningfully buffer children against nutritional shocks. While prior work documents how households respond to crises by adjusting labor supply, assets, fertility, or non-food expenditures (e.g., McKenzie, 2003; Carter & Maluccio, 2003; Aragón et al., 2021), we highlight agricultural home production as an additional and previously underexplored margin that is particularly relevant when markets and public support systems deteriorate.

Second, we contribute to the literature on the post-Soviet transition (Guriev & Zhuravskaya, 2009; Gerry & Li, 2010; Adserà et al., 2021) by showing that the health consequences of the transition were not uniform across space or cohorts. Children exposed to the crisis experienced substantial short- and long-run health penalties, but these penalties were significantly attenuated in locations where households could effectively engage in subsistence production. Our results therefore highlight an important source of heterogeneity in the long-run health effects of large-scale economic dislocations.

Third, our findings speak to a broader literature on staple crops, nutrition, and economic resilience. Seminal work by Nunn & Qian (2011) shows that the historical diffusion of potatoes in

the Old World contributed to population growth and urbanization, plausibly through improved nutrition. Building on this insight, Cook (2014) demonstrates that the effects of potato adoption were amplified in societies with greater milk consumption, highlighting dietary complementarities at the country level. Relatedly, Jia (2014) shows that the historical introduction of sweet potatoes in China mitigated the effects of weather shocks on social instability, likely by smoothing consumption at the aggregate level.

We complement this literature by providing direct micro-level evidence on the health consequences of staple crop production during a severe economic crisis. Focusing on household behavior rather than aggregate outcomes, we isolate a nutritional consumption mechanism linking potato cultivation to child health and explicitly rule out alternative channels such as income generation, food substitution, or barter and exchange. In contrast to the historical macro evidence, our analysis shows how subsistence production can buffer children against nutritional deprivation within households and generate persistent health benefits when market access collapses.

And finally, unlike work linking historical crop suitability and land productivity to long-run development outcomes (e.g., Ashraf & Galor, 2011; Alesina et al., 2013; Galor & Özak, 2016), our analysis focuses on short-run household responses to acute economic crises and directly measures child health outcomes rather than aggregate or institutional change.

Let us stress that while our results underscore the importance of subsistence production during periods of severe disruption, they should not be interpreted as an argument for subsistence agriculture as a development strategy. Rather, they highlight the role of home production as a temporary buffer when access to food markets and public support deteriorates. These findings offer broader insights into household resilience during acute economic crises, including in low- and middle-income countries facing food insecurity driven by conflict, inflation, or climate shocks.

The remainder of the paper proceeds as follows. Section 2 presents cross-country evidence. Section 3 focuses on the case of Russia discussing the institutional background and describing the RLMS household-level data. Section 4 introduces the empirical design and presents the main results, robustness checks, placebo exercises, and instrumental variable evidence. Section 5 explores mechanisms. Section discussing the external validity focusing on the evidence from Kazakhstan.

Section 7 concludes.

# 2 Child Health and Soil Suitability: Cross-Country Patterns During the Transition

## 2.1 Soil Suitability

Our empirical analysis exploits spatial variation in agroecological suitability for cultivating potatoes and other crops. We use crop-specific soil suitability indices for white potatoes, cabbage, tomatoes, beets, and carrots from the Food and Agriculture Organization (FAO)'s Global Agro-Ecological Zones (GAEZ) v4 database (Theme 4). Suitability is a composite measure combining agro-climatic potential yields with soil and terrain evaluations. The GAEZ data are provided on a regular raster grid of 5 arc-minute cells (approximately $9 \times 9$ km at the equator).

We aggregate the raster-based suitability measures to match each dataset: (i) to second administrative divisions for the Life in Transition Survey (LiTS), (ii) to the primary sampling unit (PSU) level for the Russian Longitudinal Monitoring Survey (RLMS), and (iii) to a 20 km buffer around household-location centroids for the Kazakhstan Living Standards Measurement Survey (KLSMS). Suitability indices for crops other than potatoes are used in placebo and robustness exercises.

## 2.2 World Health Organization: Growth Reference Data

Our focus outcome variable is children's z-score reflecting relative height conditional on age and gender—the *height-for-age z-score*, a standard proxy for children's health and nutritional status used widely in the economics literature (Steckel, 1995; Minoiu & Shemyakina, 2014; Bundervoet et al., 2009; Adserà et al., 2021). Height is informative about cumulative early-life conditions, including nutrition and disease environments. To compute height-for-age z-scores, we use the World Health Organization (WHO) child growth standards and growth reference data.[1] We

[1]Data are retrieved from https://www.who.int/toolkits/growth-reference-data-for-5to19-years/indicators/height-for-age and https://www.who.int/toolkits/child-growth-standards/standards/length-

construct z-score as the standardized difference between the child's observed height (as reported in the survey) and the median height of the international reference population of the same age (in months) and gender.

## 2.3 Life in Transition Survey (LiTS)

To motivate our subsequent country-specific analysis on Russia, we begin with suggestive cross-country patterns using the Life in Transition Survey (LiTS), a joint project of the EBRD and the World Bank fielded in 2006, 2010, and 2016. We use the 2016 wave because it is the first to include both self-reported and measured height for a subset of respondents, allowing us to assess reporting accuracy (Online Appendix Figure I). The 2016 LiTS covers 34 countries, including 14 post-Soviet countries (excluding Turkmenistan). The survey was implemented in a large number of primary sampling units per country (with PSU coordinates available), which we use to merge in local agroecological suitability.[2]

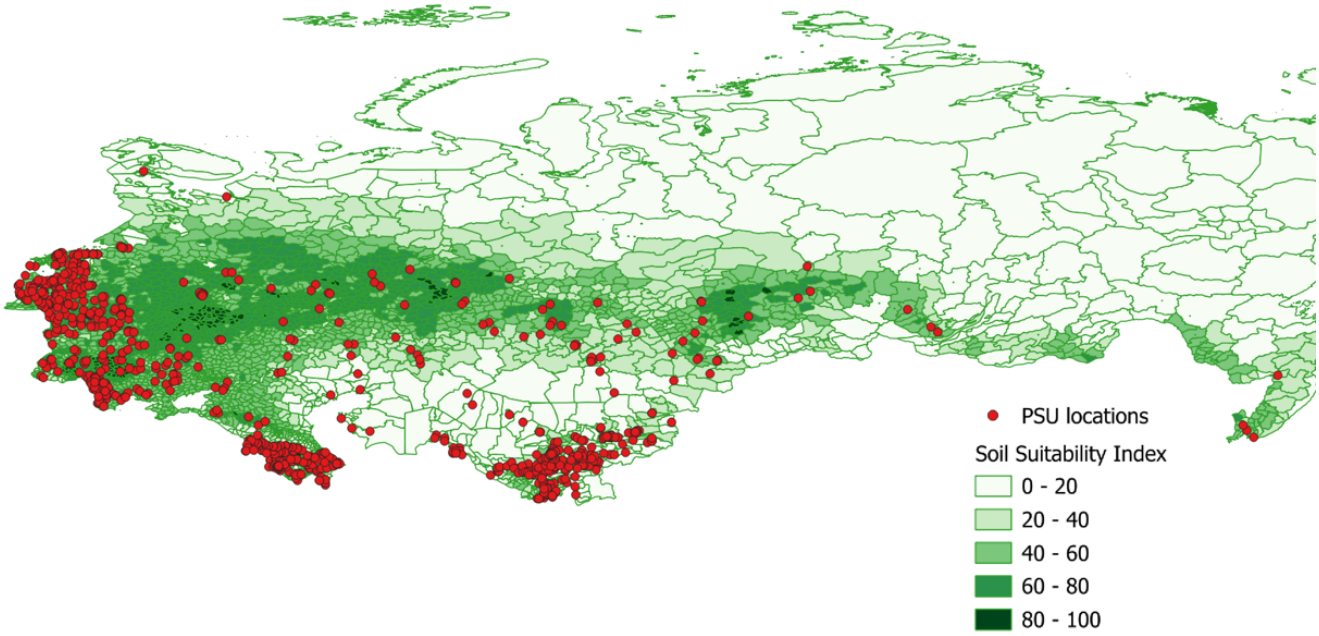
The timing of the transition from plan to market economy differed across post-Soviet countries. Following Adserà et al. (2021), we define the transition year as the first year in which the EBRD transition indicator for price liberalization reaches 3 in a given country. We use cross-country variation in these transition years to compare cohorts born before the transition to cohorts who were age five or younger during the transition year, and to examine whether these cohort differences vary systematically with local suitability for potato cultivation. Following Adserà et al. (2021), who document that cohorts born around the start of the transition are shorter in adulthood, we further ask whether the cohort penalty is smaller in locations more suitable for potato cultivation.

We merge LiTS microdata with the GAEZ potato suitability index by aggregating suitability to the second administrative division level and assigning each PSU the suitability of its administrative unit. Figure 1 illustrates variation in potato suitability across the 14 post-Soviet countries together with PSU locations. Summary statistics for the LiTS sample appear in Appendix Table A1.

height-for-age.

[2]The exact number of PSUs varies by country and wave; in 2016, coverage is typically on the order of more than one thousand PSUs per country.

**Figure 1.** Variation in soil suitability in 14 post-Soviet countries and PSUs




*Note*: The map shows the soil suitability index for potato cultivation at the second administrative division level for 14 post-Soviet countries and the locations of LiTS primary sampling units (PSUs). Darker shades of green indicate higher suitability; red dots mark PSU locations. The data is sourced from the LiTS survey (household-level cross-country data) and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

## 2.4 Cross-Country Patterns

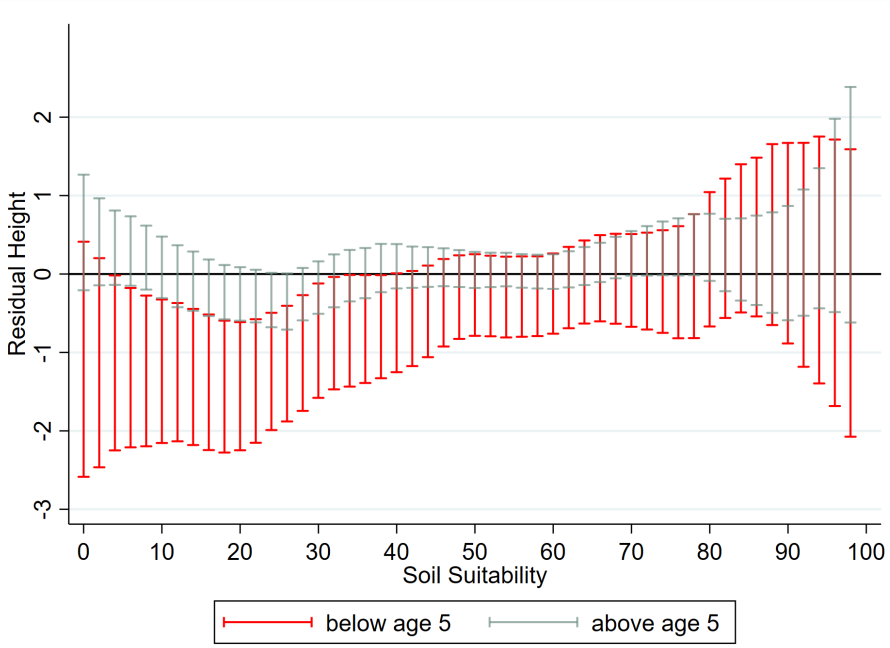
We begin by documenting cross-country patterns in height and health outcomes across the 14 post-Soviet countries. For height outcomes, we focus on respondents aged 21 and above to ensure completed growth.[3] For health outcomes, we use respondents aged 18 and above. Because the expansion of home production during the transition appears to have been particularly salient for urban households (where market disruptions were more binding and baseline subsistence activity was lower), we focus on urban residents.[4]

Figure 2 plots residual adult height (after controlling for individual characteristics, country fixed effects, and country-specific linear birth-cohort trends) against potato suitability separately

[3]Existing research indicates that most individuals reach their adult height by late adolescence, typically between ages 18 and 21. Results are similar when using a cutoff of age 18.

[4]Online Appendix Figure II provides supporting evidence for the role of urban households in potato production during the transition years (using dacha ownership and potato cultivation in Russia).

**Figure 2.** Children's height across the soil suitability index in the 14 post-Soviet countries




*Note*: The figure shows 95% confidence intervals from kernel-weighted local polynomial regressions (Epanechnikov kernel) of adult height on the potato suitability index, after residualizing height with respect to individual characteristics (age, gender, religion, and mother's education), country fixed effects, and country-specific linear birth-cohort trends. The data is sourced from the LiTS survey (household-level cross-country data) and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

for cohorts exposed to the transition in early childhood (age five and below) and for older cohorts (above age five). We consider the sample of individuals aged 21-55. The figure indicates a sizeable height gap for exposed cohorts in low-suitability locations and a much smaller gap in higher-suitability locations. In contrast, the height of older cohorts varies little with potato suitability.

We next assess whether cohort differences in adult height and current self-reported health vary systematically with local potato suitability by estimating:

$$\begin{aligned} Y_{icyp} = \alpha_c + \theta_{cy} + \beta_1 \cdot Below\ Age\ 5_{icyp} \\ + \beta_2 \cdot Suitability\ Index_{cp} \\ + \beta_3 \cdot Below\ Age\ 5_{icyp} \times Suitability\ Index_{cp} + \gamma \mathbf{X}_{icyp} + u_{icyp} \end{aligned} \tag{1}$$

where $Y_{icyp}$ is either adult height (in cm) or current self-reported health for individual $i$, born

**Table 1.** The relationship between residing on lands suitable for potato growing and the adults' height and health

| Dependent variable: | Height (cm) | | Health (1-5) | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| Below Age 5 | -1.423** | -1.615** | -0.234*** | -0.199*** |
| | (0.618) | (0.657) | (0.058) | (0.062) |
| Suitability Index | -0.012 | -0.013 | -0.000 | -0.000 |
| | (0.026) | (0.027) | (0.003) | (0.003) |
| Below Age 5 × Suitability Index | 0.022** | 0.026** | 0.004*** | 0.003*** |
| | (0.011) | (0.012) | (0.001) | (0.001) |
| Controls | ✓ | ✓ | ✓ | ✓ |
| Country-specific time trends | ✓ | ✓ | ✓ | ✓ |
| Country FE | | ✓ | | ✓ |
| $N$ obs | 6,163 | 6,163 | 7,266 | 7,266 |
| $N$ Districts | 480 | 480 | 485 | 485 |

*Note*: This table reports estimates of Equation (1) using LiTS 2016. The dependent variable is adult height in centimeters (columns 1–2) or current self-reported health on a 1–5 scale (columns 3–4, where 1 indicates "very bad" and 5 indicates "very good" health). *Below Age 5* indicates that the respondent was age five or younger in the country-specific transition year. *Suitability Index* is the potato suitability index. All specifications control for age, gender, religion, mother's education, and suitability indices for other crops (cabbage, carrots, tomatoes, and beets). Columns (2) and (4) additionally include country fixed effects; all columns include country-specific linear birth-cohort trends. The data is sourced from the Life in Transition Survey (LiTS, household-level cross-country data) and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

in year $y$ in country $c$ and interviewed in PSU $p$. $Below\,Age\,5_{icyp}$ equals one if the individual was age five or younger in the transition year in country $c$. $Suitability\,Index_{cp}$ is the potato suitability index assigned to PSU $p$ in country $c$. $\mathbf{X}_{icyp}$ includes age, gender, religion, mother's education, and suitability indices for other crops (cabbage, carrots, tomatoes, and beets). $\alpha_c$ denotes country fixed effects and $\theta_{cy}$ denotes country-specific linear birth-cohort trends. The variable $u_{icyp}$ is the regression error.

Table 1 reports estimates of Equation (1) for adult height (columns 1–2) and current self-reported health (columns 3–4). We consider the samples of individuals aged 21-55 for adult height and 18-55 for health. The standard errors are clustered at the PSU level.

Columns (1) and (2) of Table 1 present estimates for the height outcome variable. We show

that, in 2016, adults who were age five or younger during the transition year are on average 1.4–1.6 cm shorter than older cohorts (estimates are significant at the 5% level). This result is consistent with Adserà et al. (2021), who find a similar height-gap penalty for children exposed to the transition. We extend this result by obtaining the positive and significant (at 5%) interaction term with *Suitability index*, which implies that this cohort height penalty is smaller in locations with higher potato suitability. At the sample mean suitability (45.28), the implied height gap is approximately 0.4 cm.

Columns (3) and (4) of Table 1 present estimates for current self-reported health measured as a categorical variable taking values from 1 (*very bad*) and 5 (*very good*). Consistent with the results in the first two columns, Respondents who were age five or younger during the transition year report worse health on average than older cohorts, and the negative health gap is smaller in areas with higher potato suitability.[5]

Online Appendix Figure III further summarizes the implied cohort gaps at the 25th, 50th, and 75th percentiles of the potato suitability distribution. It shows that both the height and health gap are fully closed if adults live on lands with a suitability index between the 50th and 75th percentiles.

Overall, the LiTS analysis provides descriptive evidence that cohorts exposed to the transition in early childhood exhibit worse adult outcomes, and that these cohort gaps are smaller in locations more suitable for potato cultivation. LiTS, however, does not contain information on household home production during the transition period and therefore cannot directly test whether potato cultivation within households mediated these patterns. We turn to the Russian Longitudinal Monitoring Survey (RLMS), a nationally representative household survey launched in 1994, which contains detailed measures of household home production, to examine the potato-production mechanism in Russia and to assess household-level adaptation during the transition.

[5]We also report results for adults who were aged four and younger, and those who were aged six and younger in Online Appendix Table I. To further ensure that the cohort comparisons are reliable, Online Appendix Table II switches to the samples of individuals aged 21-65 (18-65) and 21-99 (18-99), respectively. The mitigating role of potato cultivation persists in all cases.

# 3 Child Health and Soil Suitability: The Case of Russia

## 3.1 Institutional Background

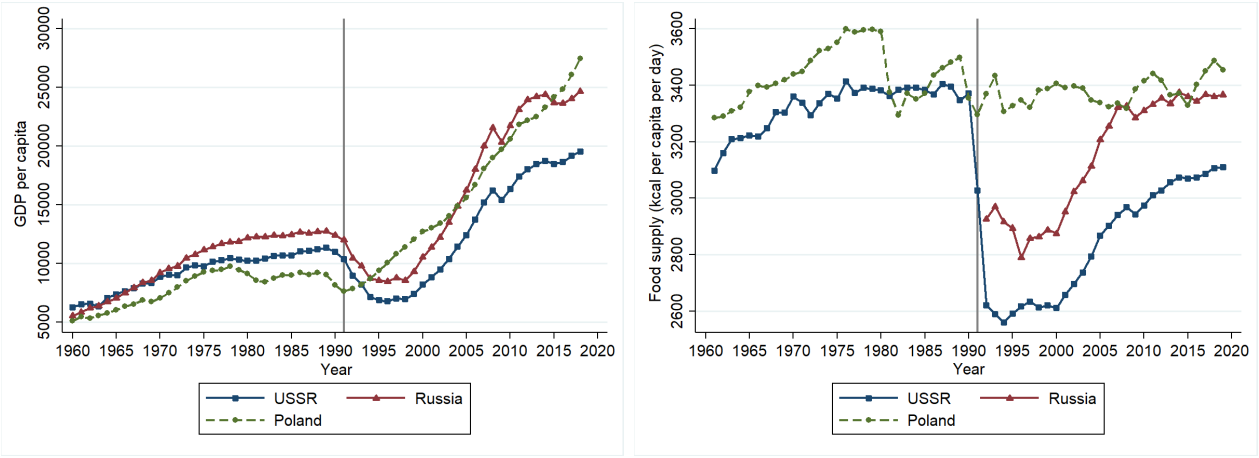
The collapse of the Soviet Union in 1991 triggered a severe economic contraction across the former republics. This contraction was accompanied by sharp reductions in food consumption and caloric intake, indicative of widespread material deprivation. As shown in Figure 3, GDP per capita in Russia and the USSR declined sharply throughout the 1990s (*panel a*), while daily per capita calorie supply—a proxy for population-level nutritional adequacy—fell in parallel (*panel b*). In contrast, Poland, which was not part of the USSR, underwent economic transition without a comparable collapse in calorie availability.

Russia experienced a particularly dramatic decline in living standards. Between 1990 and 1998, GDP per capita fell by nearly 40%, representing one of the deepest peacetime economic contractions in the postwar era. Throughout the 1990s, households faced steep declines in real incomes and a sharp increase in income inequality (Guriev & Zhuravskaya, 2009; Khvan et al., 2020; Gerber & Hout, 1998). Between 1992 and 1998, the share of the population living in poverty rose from 12% to 46% (Lunze et al., 2015). These developments coincided with accelerating inflation following price liberalization and rising unemployment (Koen & DeMasi, 1997; Svejnar, 2002), further eroding households' ability to purchase basic goods.

The decline in food consumption was especially pronounced for nutritionally important food groups such as meat, fish, dairy, vegetables, and fruits, contributing to deteriorating dietary quality and adverse health outcomes. For example, the share of underweight children aged 6–18 increased from 6.9% to 8.1% between 1992 and 1998 (Boylan et al., 2009). Figure 4 documents changes in consumption across major food groups, highlighting the magnitude of the contraction relative to 1990 levels.

With limited and fragmented formal safety nets, many households turned to informal strategies to mitigate food insecurity. One prominent response was private food production, primarily through cultivation on small household plots. During the 1990s and early 2000s, many Russian families began producing—or expanded production of—potatoes and other vegetables to com-

**Figure 3.** GDP per capita and daily supply of calories in Russia, the entire USSR, and Poland




(a) GDP per capita

(b) Daily supply of calories

*Note*: The figure depicts GDP per capita (*panel a*) and the daily supply of calories (*panel b*) in the USSR, Russia, and Poland before and during the transition crisis. GDP per capita is expressed in 2011 US dollars. After 1991, calorie supply for the USSR is computed as the average across post-Soviet countries. Poland is included for reference.

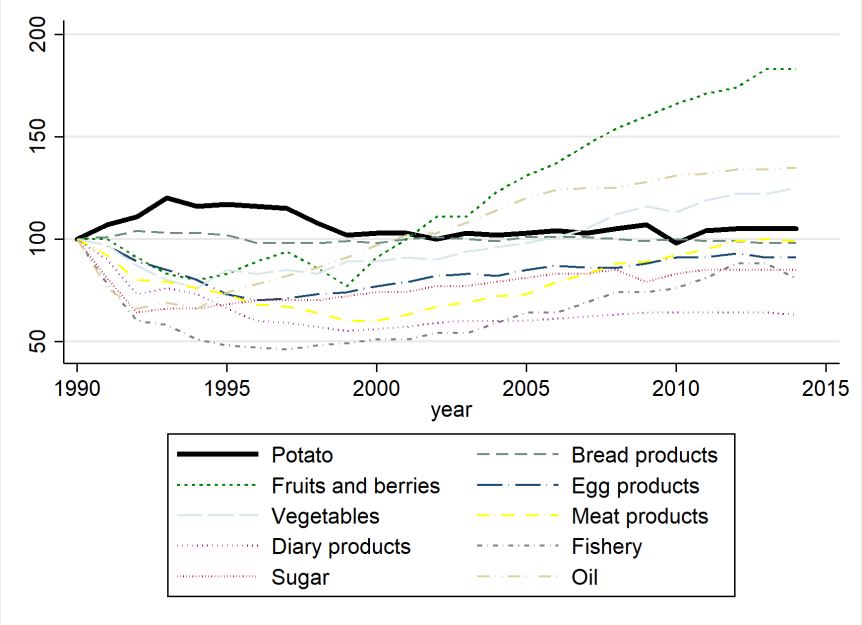
Source: Authors' calculations using data from OurWorldInData.org.

pensate for declining real incomes and rising food prices. Data from the RLMS (see Section 3.2 below), indicate that over 60% of households reported growing potatoes during the 1990s (see Online Appendix Figure IV). In contrast, fewer than 1% reported private grain cultivation. Consistent with these patterns, potatoes were the only major food product to exhibit sustained or rising consumption during the crisis years (Figure 4).

This behavioral shift was accompanied by a large reallocation of land toward subsistence potato farming. Between 1990 and 1995, the area of household plots used for potato cultivation increased by 66%, from 1,805 thousand hectares to 2,998 thousand hectares. By 1995, nearly 88% of all potatoes in Russia were produced in household plots, up from 58% in 1990, reflecting a substantial withdrawal of potato production from formal agricultural enterprises.

However, not all regions were equally positioned to benefit from this adaptive strategy. The feasibility and productivity of potato cultivation vary substantially with soil quality and climate. Using data from the FAO's Global Agro-Ecological Zones (GAEZ v4), Figure 5 maps agroecological suitability for potato cultivation across Russian regions (*oblasts*). The Central and Volga regions

**Figure 4.** Food consumption in Russia relative to 1990 levels




*Note:* The figure shows consumption of major food groups in Russia over time, expressed as a percentage of 1990 levels. Data is sourced from the Federal State Statistics Service (Rosstat) and Health Care Statistics (2001, 2015).

exhibit the highest suitability, while northern, Siberian, and Far Eastern regions display more limited potential.

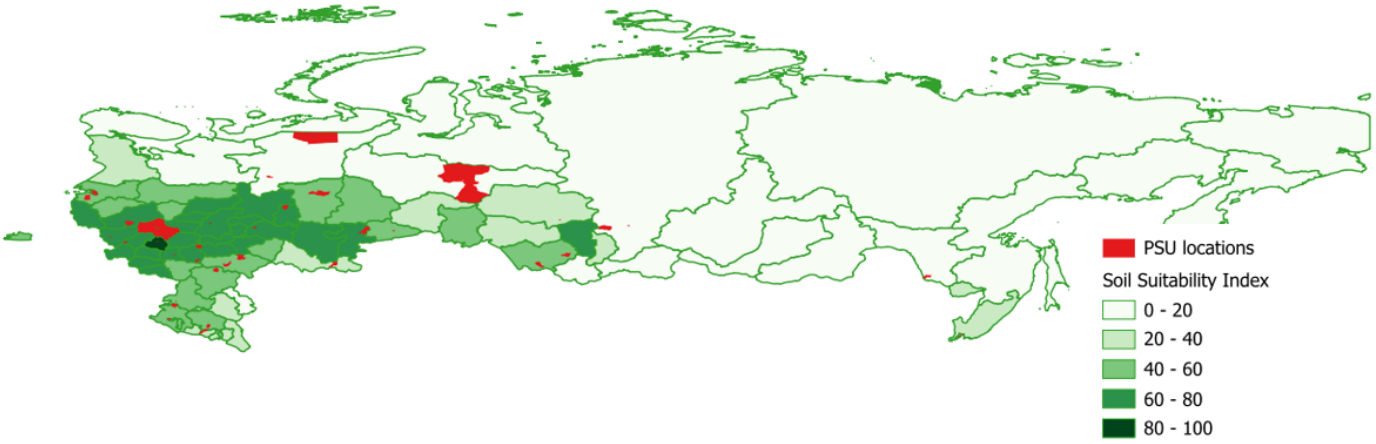
Overall, the crisis of the 1990s created both the need and the incentive for households to engage in subsistence farming. Potatoes—owing to their nutritional density, storability, and low capital requirements—became a central component of this response. The extent to which this strategy mitigated adverse health consequences, however, depended on agroecological endowments, which form the basis of our empirical analysis below.

## 3.2 Russian Longitudinal Monitoring Survey (RLMS)

**The key features of the RLMS**. The Russian Longitudinal Monitoring Survey (RLMS) is a nationally representative panel survey designed to track the effects of economic reforms on the health and economic welfare of households and individuals.[6] Individual questionnaires include self-reported health measures for all household members, including children. For our purposes,

[6]For example, Kueng & Yakovlev (2021) use RLMS data to study the long-run effects of Russia's anti-alcohol campaign.

**Figure 5.** Land suitability for potato cultivation in Russia



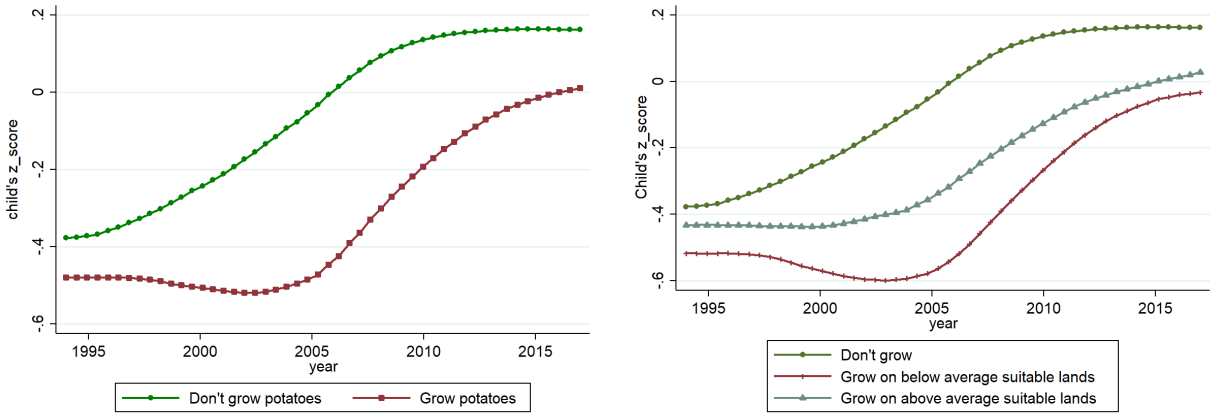

*Note*: The map shows spatial variation in the soil suitability index for potato cultivation across Russian regions (*oblasts*). Darker shades indicate higher suitability. Red polygons mark RLMS primary sampling units (PSUs). The data is sourced from the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ) v4 database and the RLMS.

we use (i) reported child height to construct height-for-age z-scores by age and gender, and (ii) adult height measures. The household questionnaire also contains detailed information on plot cultivation and potato growing, which we use to construct our main explanatory variables.

We additionally use the RLMS *Constructed Variables* files, which provide harmonized measures of household income, expenditures, and related aggregates. These variables serve as controls in the main regressions and in tests assessing whether potato suitability is correlated with observable socio-economic characteristics. In our merged sample, the potato suitability index is observed for 38 PSUs, ranging from 0 to 77.4 with a mean of 50.6. Summary statistics are reported in Appendix Table A2.

**Stylized facts**. We begin by documenting two descriptive patterns in the RLMS data. First, Children's z-scores were relatively low in the early transition years and improved over time, while the share of households reporting potato cultivation was very high during the crisis and declined during the subsequent recovery (Online Appendix Figure V). Second, potato cultivation is more prevalent in higher-suitability PSUs, consistent with households concentrating production where

**Figure 6.** The evolution of children's height-to-age z-scores, *by household groups*




(a) (b)

*Note*: This figure shows children's height-for-age z-scores by year and different household groups. Panel (*a*) shows kernel-weighted local polynomial regressions of children's height-for-age z-scores for two groups: (i) households that did not grow potatoes and (ii) households that grew potatoes. Panel (*b*) shows the corresponding regressions for three groups: (i) households that did not grow potatoes, (ii) households that grew potatoes on below-average suitability lands, and (iii) households that grew potatoes on above-average suitability lands. In both panels, regressions use an Epanechnikov kernel. The data is sourced from the RLMS.

expected returns are higher (Online Appendix Figure VI).[7]

Figure 6 links these patterns to child health outcomes. Panel (*a*) compares height-for-age z-scores between children in households that did and did not grow potatoes. Panel (*b*) further splits potato-growing households into those cultivating on below- versus above-average suitability lands. Children in potato-growing households exhibit lower average z-scores, consistent with negative selection into potato cultivation (e.g., poorer households being more likely to grow potatoes). At the same time, conditional on cultivation, children in higher-suitability areas appear closer to the non-growing benchmark, suggesting that the effectiveness of this coping strategy depends on agroecological conditions.

These descriptive patterns motivate the fixed-effects strategy developed in the subsequent Section 4, in which we separate selection into potato cultivation from the differential effectiveness of potato cultivation across suitability levels.

[7]For concreteness, we define higher-suitability PSUs as areas with the suitability index above 20.

# 4 Empirical Design and Baseline Results

## 4.1 Child Height During the Transition in Russia

**Empirical specification**. Our identification strategy exploits the variation in soil suitability for potato cultivation across 38 PSUs. We begin our analysis with assessing the short-run relationship between household potato production and children's nutritional status during the transition, proxied by height-for-age z-scores. We estimate the following specification:

$$Y_{irt} = \alpha_i + \lambda_{rt} + \mu_{jt} + \beta_1 \cdot Potato_{irt-1} + \beta_2 \cdot Potato_{irt-1} \times Suitability\ Index_r + \gamma \mathbf{X}_{irt} + \varepsilon_{irt} \tag{2}$$

where $Y_{irt}$ denotes either the height-for-age z-score or an indicator of stunting for child $i$ in region (PSU) $r$ and year $t$. $Potato_{irt-1}$ is an indicator equal to one if the household grew potatoes in the previous year, and $Suitability\,Index_r$ measures soil suitability for potato cultivation in region $r$. The vector $\mathbf{X}_{irt}$ includes the child's age in months, household size, total household income, and PSU-level annual night-time lights. The variable $\varepsilon_{irt}$ is the regression error.

Equation (2) also features several high-dimensional fixed effects. Individual fixed effects $\alpha_i$ absorb time-invariant child-level heterogeneity. Region*year fixed effects $\lambda_{rt}$ control for time-varying regional shocks, while occupation*year fixed effects $\mu_{jt}$ account for aggregate shocks to the employment sector of the household head—an important consideration during the transition from a planned to a market economy.

We use a lagged indicator for potato cultivation because potatoes are typically stored for year-round consumption, implying that nutritional effects may materialize with a delay. Our baseline sample covers the years 1994–2001, which correspond to the most severe phase of the transition. As illustrated in Figure 3, GDP per capita and caloric availability continued to decline through the late 1990s, with recovery beginning in the early 2000s. Consistent with this pattern, the share of households growing potatoes in the RLMS fell from an average of 60.8% during 1994–2001 to

**Table 2.** Short-run relationship between potato cultivation and child height-for-age z-score

| Dependent variable: | Height-for-age z-score | | | | |
|---|---|---|---|---|---|
| | Full sample | | | | Use lands |
| | (1) | (2) | (3) | (4) | (5) |
| Potato | -0.479*** | -0.482*** | -0.567*** | -0.480** | -0.632*** |
| | (0.172) | (0.167) | (0.169) | (0.187) | (0.184) |
| Potato × Suitability index | 0.009** | 0.009*** | 0.010*** | 0.009** | 0.011*** |
| | (0.003) | (0.003) | (0.003) | (0.004) | (0.004) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| Individual FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | | ✓ | | | ✓ |
| PSU × Year FE | | | ✓ | | |
| Job occupation × Year FE | | | | ✓ | |
| *N* individuals | 2,642 | 2,642 | 2,642 | 2,642 | 1,937 |
| *N* obs | 5,426 | 5,426 | 5,426 | 5,426 | 3,753 |
| Within $R^2$ | 0.007 | 0.010 | 0.066 | 0.031 | 0.011 |
| Mean Suitability | 50.6 | 50.6 | 50.6 | 50.6 | 50.6 |

*Note*: This table reports estimates of Equation (2), where the dependent variable is the child height-for-age z-score. The indicator *Potato* equals one if the household grew potatoes in the previous year. The interaction term captures how the association between potato cultivation and child height varies with the regional soil *Suitability index* for potato cultivation. Columns (1) to (4) use the full sample of households, while column (5) restricts the sample to households that explicitly report using land for home agricultural production. Control variables include the child's age in months, household size, total household income, and PSU-level annual night-time lights. The sample covers the transition period 1994–2001. Household data are drawn from the RLMS, and soil suitability indices are from the FAO Global Agro-Ecological Zones database (GAEZ v4).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

42.2% after 2002.[8]

**Baseline result #1: Height-for-age z-score**. Table 2 reports estimates of Equation (2). Column (1) shows a negative and highly statistically significant coefficient on the potato cultivation indicator and a positive and significant coefficient on its interaction with soil suitability. The negative coefficient implies that children in households that grew potatoes were, on average, approximately 0.5 standard deviations shorter in terms of height-to-age z-score, corresponding to a height deficit of about $-0.479 \cdot 5.5 = -2.75$ cm, where 5.5 cm is the average standard deviation of height in the WHO reference population. We interpret this pattern as reflecting negative selection

[8]We exploit the post-transition period (2002–2017) as a placebo exercise below.

into potato cultivation, whereby poorer households were more likely to rely on home production.

Importantly, the positive interaction term indicates that cultivating potatoes on more suitable land substantially attenuated this height gap. For households residing in localities with average soil suitability, the estimated height deficit shrinks from 2.75 cm to approximately 0.31 cm relative to households cultivating potatoes on unsuitable land. Online Appendix Figure VII illustrates how the height gap progressively narrows across the distribution of soil suitability.

Columns (2) through (4) successively add year fixed effects, PSU*year fixed effects, and occupation*year fixed effects. Across these increasingly demanding specifications, the estimated coefficients remain highly statistically significant and even become slightly larger in magnitude, indicating that the baseline results are not driven by region-specific or occupation-specific aggregate shocks during the transition.

Column (5) addresses the concern that comparisons between households that did and did not use land for home production may be inappropriate. Restricting the sample to households that explicitly reported using land for agriculture yields estimates that are similar in sign and larger in magnitude.

**Baseline result #2: The likelihood of stunting**.

We next replace the height-for-age z-score with an indicator for stunting, defined as having a height-for-age z-score below $-2$. Results are reported in Table 3, which preserves the same structure as Table 2 above. Consistent with the z-score results, potato cultivation is associated with a higher probability of stunting, again reflecting negative selection. However, the interaction with soil suitability is negative and statistically significant. Cultivating potatoes on land with average suitability reduces the probability of stunting by approximately 9 percentage points, nearly offsetting the baseline gap. Online Appendix Figure VIII illustrates how this gap declines across the distribution of soil suitability.

**Identification concerns and robustness checks**. The first and most important concern is that households growing potatoes on more suitable land differ systematically from those growing potatoes on less suitable land. To address this, we regress a range of household characteristics on

**Table 3.** Short-run relationship between potato cultivation and the probability of stunting

| Dependent variable: | $\mathbb{1}\{Height\text{-}for\text{-}age\ z\text{-}score < -2\}$ | | | | |
|---|---|---|---|---|---|
| | Full sample | | | | Use lands |
| | (1) | (2) | (3) | (4) | (5) |
| Potato | 0.108** | 0.109** | 0.113** | 0.108*** | 0.158*** |
| | (0.046) | (0.046) | (0.052) | (0.039) | (0.046) |
| Potato × Suitability index | -0.002** | -0.002* | -0.002* | -0.002** | -0.002** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| Individual FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | | ✓ | | | ✓ |
| PSU × Year FE | | | ✓ | | |
| Job occupation × Year FE | | | | ✓ | |
| $N$ individuals | 2,642 | 2,642 | 2,642 | 2,642 | 1,937 |
| $N$ obs | 5,426 | 5,426 | 5,426 | 5,426 | 3,753 |
| Within $R^2$ | 0.007 | 0.008 | 0.054 | 0.026 | 0.008 |
| Mean Suitability | 50.6 | 50.6 | 50.6 | 50.6 | 50.6 |

*Note*: This table reports estimates of Equation (2), where the dependent variable is an indicator equal to one if the child's height-for-age z-score is below $-2$ standard deviations. The indicator *Potato* equals one if the household grew potatoes in the previous year. The interaction term captures how the association between potato cultivation and stunting varies with the regional soil *Suitability index* for potato cultivation. Columns (1) to (4) use the full sample of households, while column (5) restricts the sample to households that report using land for home agricultural production. Control variables include the child's age in months, household size, total household income, and PSU-level annual night-time lights. The sample covers the transition period 1994–2001. Household data are drawn from the RLMS, and soil suitability indices are from the FAO Global Agro-Ecological Zones database (GAEZ v4). Standard errors are clustered at the PSU level and reported in parentheses.

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

potato cultivation and its interaction with soil suitability, controlling for household and year fixed effects. Among these characteristics, we consider household income, household savings, urban versus rural residence, poverty status, whether owns a private plot of land (*dacha*), whether uses land for agricultural production, the number of family members, the number of children below 7 years old, the number of working-age males in the household, and the number of post-work-age males. The estimated interaction terms, reported in Online Appendix Table IX, exhibit no statistically significant differences across all but one outcomes and are economically negligible. While one specification—with household income as the dependent variable—yields a marginally

significant interaction term, the underlying magnitude is again economically negligible.

Another concern relates to statistical inference. In the baseline specification, we cluster standard errors at the PSU level to allow for correlation among individuals residing within the same locality. However, this approach yields a relatively small number of clusters (38), given the total number of observations (5,426), and does not allow for intertemporal correlation. To address these concerns, we re-estimate the baseline regressions for height-for-age z-scores and the probability of stunting using three alternative clustering schemes.

First, we cluster standard errors at the PSU*year level, which allows for both spatial and intertemporal correlation. As shown in Online Appendix Tables III and IV, standard errors increase modestly under this scheme in both cases, but the statistical significance of the baseline estimates is preserved. Second, we split the soil suitability into 20 quintile bins and cluster at the suitability bin*year level, thus allowing for a correlation between households residing in different PSUs but similar soil suitability. Online Appendix Tables V and VI report the results demonstrating the rise of standard errors, as in the case of PSU*year clustering, which again does not harm the statistical significance. Third, we cluster at the individual level, yielding up to 2,642 clusters. Online Appendix Tables VII and VIII show that standard errors also increase relative to the baseline, but statistical significance remains unchanged even under this conservative specification. Overall, the results are robust to alternative assumptions regarding the spatial and intertemporal correlation structure of the error term.

Overall, our short-term estimates show that home production of potatoes on suitable lands significantly narrows the height gap between children from households that grew potatoes and those that did not. These results are not driven by time-varying, region-specific aggregate shocks during the transition crisis, nor are they confounded by aggregate shocks affecting the occupations of household heads during the crisis. Overall, the short-run estimates indicate that home production of potatoes on suitable land substantially narrows the height gap between children in potato-growing and non-growing households. These results are not driven by time-varying regional shocks during the transition crisis, nor are they confounded by aggregate shocks to the occupations of household heads.

## 4.2 Exposure to Transition and Adult Height in Russia

We next examine whether the mitigating role of home potato cultivation during the transition crisis persisted into adulthood. This long-run analysis builds on Adserà et al. (2021), who use RLMS data to document that individuals born at the onset of the transition in Russia (1992) are shorter in adulthood than cohorts born before or after the transition.[9] We extend their framework by examining whether this cohort height penalty varies systematically with household potato cultivation and soil suitability.

Following Adserà et al. (2021), we define three measures of early-life exposure to the transition: (i) individuals born in the transition year (ET), (ii) individuals born or aged one during the transition year (ET1), and (iii) individuals born or aged one or two during the transition year (ET2). Using these exposure definitions, we assess whether adults exposed to the transition in early childhood exhibit different height outcomes depending on whether their households cultivated potatoes on more versus less suitable land during the crisis.

Our analysis focuses on adults observed in the RLMS after 2001 and before 2017. We estimate the following specification:

$$\begin{aligned} Height_{irt} = \alpha_t + \lambda_r + \beta_1 ET_{ir} + \delta_1 \cdot Potato_{ir} \\ + \delta_2 \cdot Potato_{ir} \times ET_{ir} \\ + \delta_3 \cdot Potato_{ir} \times Suitability\ Index_r \\ + \delta_4 \cdot Potato_{ir} \times ET_{ir} \times Suitability\ Index_r + \gamma \mathbf{X}_{irt} + \epsilon_{irt} \end{aligned} \tag{3}$$

where $Height_{irt}$ is individual $i$'s self-reported adult height; $ET_{ir}$ indicates early-life exposure to the transition under the definitions above; $Potato_{ir}$ measures the number of years the individual's household cultivated potatoes during 1994–2001; and $Suitability\ Index_r$ is the regional soil suitability index for potato cultivation. The vector $\mathbf{X}_{irt}$ includes gender, age, settlement type (urban/rural), household size, total real household income, a linear time trend, and mother's height

[9] Appendix Table X replicates this result using RLMS respondents observed after 2001 and confirms that individuals born at the start of the transition are, on average, 1–1.4 cm shorter than adjacent cohorts.

to account for genetic transmission.

Table 4 reports the estimates of Equation (3). Columns (1)–(3) present baseline results for the three exposure definitions, while columns (4)–(6) additionally control for mother's height. Each individual appears only once in the sample, and standard errors are clustered at the PSU level.

We first find that the coefficient on *Potato* is either statistically insignificant (columns 1–3) or marginally significant (columns 4–6), and that its interaction with the suitability index is small and statistically insignificant. These results indicate that potato cultivation is not systematically associated with adult height among individuals who were not exposed to the transition in early childhood ($ET = 0$).

Second, we obtain negative and statistically significant estimates on the $Potato \times ET$ interaction variable. Adults who were exposed to the transition as young children and whose households cultivated potatoes are, on average, 1.2–2 cm shorter than comparable unexposed cohorts. This pattern mirrors the short-run results and reflects negative selection into potato cultivation: households facing greater economic hardship were more likely to adopt subsistence farming during the crisis.

Crucially, we find positive and highly statistically significant estimates for the triple interaction term $Potato \times ET \times Suitability\,Index$. This coefficient captures the differential effectiveness of potato cultivation across agroecological conditions. The estimates imply that, among transition-exposed cohorts, cultivating potatoes on more suitable land substantially attenuated—and in many cases fully offset—the adult height penalty. At the sample mean level of soil suitability, the estimated height gap for individuals born in the transition year is effectively eliminated. These results remain robust after controlling for mother's height, suggesting that they are not driven by differential genetic endowments.

Taken together, the long-run evidence shows that while potato cultivation was negatively selected, its effectiveness depended critically on land suitability. Home production on suitable land provided a durable nutritional buffer during early childhood that translated into improved adult height outcomes. In the next subsections, we further probe the validity of this interpretation by examining omitted correlates, placebo crops and livestock, and instrumental variables evidence.

**Table 4.** Long-run relationship between potato cultivation and adult height

| Dependent variable: | Self-reported adult height | | | | | |
|---|---|---|---|---|---|---|
| Age at transition (*years*): | 0 | 0-1 | 0-2 | 0 | 0-1 | 0-2 |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Exposed to Transition (ET) | 0.263 | -0.463 | 0.563 | 1.341 | -0.831 | -0.554 |
| | (0.813) | (0.813) | (0.793) | (0.987) | (0.777) | (0.835) |
| Potato | 0.019 | 0.026 | 0.032 | 0.280* | 0.298* | 0.299* |
| | (0.176) | (0.178) | (0.180) | (0.151) | (0.156) | (0.154) |
| Potato × ET | -2.033*** | -1.489** | -1.401** | -1.937*** | -1.223*** | -1.595*** |
| | (0.723) | (0.559) | (0.541) | (0.509) | (0.274) | (0.294) |
| Potato × Suitability index | -0.001 | -0.002 | -0.002 | -0.004 | -0.004 | -0.005 |
| | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) | (0.003) |
| Potato × ET × Suitability index | 0.041** | 0.031*** | 0.032*** | 0.032** | 0.030*** | 0.028*** |
| | (0.016) | (0.010) | (0.009) | (0.013) | (0.005) | (0.005) |
| Mother's height | | | | 0.399*** | 0.399*** | 0.399*** |
| | | | | (0.030) | (0.030) | (0.030) |
| Other controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PSU FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Linear time trend | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ obs | 9,479 | 9,479 | 9,479 | 2,351 | 2,351 | 2,351 |
| $R^2$ (adj.) | 0.511 | 0.511 | 0.512 | 0.531 | 0.532 | 0.532 |

*Note*: This table reports estimates of Equation (3), where the dependent variable is self-reported adult height. The sample includes all adults observed in the RLMS after 2001. Following Adserà et al. (2021), we consider three measures of early-life exposure to the transition (*ET*): individuals born in the transition year (columns 1 and 4, *0 years*); individuals born in or aged one during the transition year (columns 2 and 5, *0–1 years*); and individuals born in or aged one or two during the transition year (columns 3 and 6, *0–2 years*). *Potato* measures the number of years the individual's household cultivated potatoes during 1994–2001. *Suitability index* is the regional soil suitability index for potato cultivation. All specifications control for gender, age, settlement type (urban/rural), household size, and total real household income. Columns (4)–(6) additionally control for mother's height. The data is sourced from the RLMS from 1994 to 2017 and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

## 4.3 Omitted Correlates of Soil Suitability

Our identification strategy relies on the assumption that soil suitability for potato cultivation does not affect children's nutritional outcomes through channels other than household potato production. A potential violation of this assumption would arise if regions with more suitable soils were systematically more (or less) economically developed, such that children residing in those regions enjoyed better (or worse) nutritional environments irrespective of home production. To assess this concern, we examine whether soil suitability is correlated with a broad set of household- and region-level socio-economic characteristics.

Specifically, we aggregate household-level economic outcomes to the primary sampling unit (PSU) level and estimate their relationship with the potato suitability index. These outcomes include log total household income, log total expenditures, log total savings, and an indicator for whether a household belongs to a regional poverty group. In addition, we collect PSU-level characteristics from Multistat, including average wages, the share of profitable firms, the share of the female population, and the share of public employees.[10] To examine correlations both during and after the transition period, we estimate the following random-effects specification over the period 1994–2017:[11]

$$Y_{rt} = \alpha + \lambda_t + \beta_1 \cdot Suitability\ Index_r + \beta_2 \cdot Suitability\ Index_r \times Post\ Transition_t + \epsilon_{rt} \tag{4}$$

where $Y_{rt}$ denotes one of the PSU-level outcomes in region $r$ and year $t$. The variable $\lambda_t$ captures year fixed effects. $Suitability\, ndex_r$ measures the soil suitability for potato cultivation, and $Post\, Transition_t$ is an indicator equal to one for years after 2001. The variable $\epsilon_{rt}$ is the regression error.

Online Appendix Figures IX and X present pairwise correlations between soil suitability and each outcome variable. Consistent with the identifying assumption, these correlations are uni-

[10] Data are retrieved from http://multistat.ru/.

[11] Because soil suitability varies only at the PSU level, PSU fixed effects cannot be included. We therefore estimate a random-effects model to allow for serial correlation in the error term.

**Table 5.** Relationships between various PSU characteristics and the soil suitability index

| *Panel A* | Dependent variable: | | | |
|---|---|---|---|---|
| | Total Income | Total Expenditures | Total Savings | Poverty Group |
| | (1) | (2) | (3) | (4) |
| Suitability index | 0.0191 | 0.0199 | 0.0005 | 0.0004 |
| | (0.0214) | (0.0243) | (0.0008) | (0.0036) |
| Suitability index × Post Transition | -0.0117 | -0.0130 | -0.0006 | 0.0011 |
| | (0.00720) | (0.0092) | (0.0005) | (0.0029) |
| Year FE | ✓ | ✓ | ✓ | ✓ |
| N | 912 | 912 | 912 | 912 |

| *Panel B* | Dependent variable: | | | |
|---|---|---|---|---|
| | Wage | Share of profitable firms | Share of females | Share of public employees |
| | (1) | (2) | (3) | (4) |
| Suitability index | -0.0028 | 0.0491 | 0.0000 | 0.0007 |
| | (0.0070) | (0.0676) | (0.0000) | (0.0010) |
| Suitability index × Post Transition | 0.0007 | -0.0340 | 0.0000 | -0.0006 |
| | (0.0023) | (0.0480) | (0.0000) | (0.0011) |
| Year FE | ✓ | ✓ | ✓ | ✓ |
| N | 420 | 420 | 324 | 390 |

*Note*: This table reports estimates of Equation (4). The dependent variable is one of the following PSU-level outcomes in region $r$ and year $t$: log total household income, log total household expenditures, log total household savings, an indicator for belonging to a regional poverty group, log average wages, the share of profitable firms, the share of the female population, or the share of public employees. All household-level variables are averaged across observed households within each PSU-year. $Post\,Transition$ is an indicator equal to one for years after 2001. *Panel A* reports results for household-level economic characteristics, while *Panel B* reports results for PSU-level characteristics obtained from administrative data. Year fixed effects are included in all specifications. Household-level data is sourced from the RLMS (1994–2017), PSU-level data is drawn from http://multistat.ru/, and soil suitability for potato cultivation is taken from the FAO Global Agro-Ecological Zones database (GAEZ v4).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

formly close to zero.

Table 5 reports the regression estimates from Equation (4). Panel A presents results for household-level economic characteristics aggregated to the PSU level, while Panel B reports results for PSU-level characteristics obtained from administrative data. Across all specifications,

the coefficients on the soil suitability index are small and statistically insignificant, both during and after the transition period. Taken together, these results indicate that soil suitability for potato cultivation is not systematically related to regional socio-economic conditions, supporting the interpretation that the main results are unlikely to be driven by omitted correlates of soil suitability.

## 4.4 Placebo Analyses: Growing Other Crops and Livestock in Russia

**Placebo test #1: Other crops and livestock during transition**. To assess whether the effects we attribute to potato cultivation reflect broader household agricultural activity rather than a crop-specific mechanism, we extend Equation (2) by sequentially including indicators for the cultivation of other crops and livestock reported in the RLMS. For crops, we focus on cabbage, tomatoes, beets, and carrots, for which the FAO provides crop-specific soil suitability indices. For livestock, we construct an indicator encompassing cows, pigs, sheep and goats, and poultry. In the absence of animal-specific agroecological suitability measures, we proxy suitability using the potato suitability index.[12]

In all specifications, we continue to control for potato cultivation and its interaction with potato suitability, since households that grow potatoes often cultivate other crops or keep livestock as well. We first introduce each crop or animal separately and then estimate a specification that includes all crops and animals jointly. Table 6 reports the corresponding estimates for the transition period (1994–2001).

Across all specifications, none of the placebo crops or livestock indicators exhibit a statistically significant relationship with children's height-for-age z-scores. Moreover, interactions between the cultivation of these crops or animals and their respective suitability measures are also insignificant. The only exception is cabbage, for which the interaction with suitability is marginally significant and small in magnitude. Overall, these results indicate that the mitigating effects documented in the baseline analysis are specific to potato cultivation and do not reflect general subsistence farming

[12]No animal-specific agroecological suitability measures are available. We therefore interact livestock cultivation with potato suitability as a conservative placebo, allowing livestock production to benefit from the same environmental conditions that favor potato cultivation.

**Table 6.** Placebo tests: Cultivation of other crops and livestock and child height during the transition, *1994–2001*

| Dependent variable: | Height-for-age z-score | | | | | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Grew potato | -0.567*** | -0.514*** | -0.509*** | -0.515** | -0.535*** | -0.562*** | -0.506*** |
| | (0.167) | (0.168) | (0.171) | (0.195) | (0.172) | (0.167) | (0.184) |
| Grew potato × Potato Suitability | 0.010*** | 0.008** | 0.009** | 0.009** | 0.009*** | 0.010*** | 0.009** |
| | (0.003) | (0.003) | (0.003) | (0.004) | (0.003) | (0.003) | (0.004) |
| Grew cabbage | | -0.267* | | | | | -0.211 |
| | | (0.151) | | | | | (0.183) |
| Grew cabbage × Cabbage Suitability | | 0.006* | | | | | 0.006* |
| | | (0.003) | | | | | (0.003) |
| Grew tomato | | | -0.159 | | | | -0.122 |
| | | | (0.103) | | | | (0.110) |
| Grew tomato × Tomato Suitability | | | 0.003 | | | | 0.002 |
| | | | (0.004) | | | | (0.003) |
| Grew beets | | | | -0.149 | | | -0.106 |
| | | | | (0.207) | | | (0.252) |
| Grew beets × Beet Suitability | | | | 0.001 | | | 0.000 |
| | | | | (0.004) | | | (0.004) |
| Grew carrot | | | | | -0.071 | | 0.100 |
| | | | | | (0.123) | | (0.109) |
| Grew carrot × Carrot Suitability | | | | | 0.000 | | -0.003 |
| | | | | | (0.003) | | (0.002) |
| Grew livestock | | | | | | -0.178 | -0.138 |
| | | | | | | (0.330) | (0.333) |
| Grew livestock × Potato Suitability | | | | | | 0.005 | 0.005 |
| | | | | | | (0.008) | (0.008) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Individual FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PSU × Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ individuals | 2,642 | 2,642 | 2,642 | 2,642 | 2,642 | 2,642 | 2,642 |
| $N$ obs | 5,426 | 5,422 | 5,423 | 5,421 | 5,422 | 5,414 | 5,408 |
| Within $R^2$ | 0.006 | 0.007 | 0.007 | 0.007 | 0.006 | 0.006 | 0.010 |

*Note*: This table reports placebo tests examining whether the cultivation of crops other than potatoes or livestock is associated with children's height-for-age z-scores during the transition period (1994–2001). Crops include cabbage, tomatoes, beets, and carrots; livestock includes cows, pigs, sheep and goats, and poultry. All specifications control for potato cultivation and its interaction with potato suitability. Control variables include the child's age in months, household size, total household income, and PSU-level annual night-time lights. Individual and PSU × year fixed effects are included in all regressions. Household data are drawn from the RLMS, and crop suitability indices are taken from the FAO Global Agro-Ecological Zones database (GAEZ v4). Standard errors are clustered at the PSU level and reported in parentheses.

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

or livestock production. This strengthens the interpretation that potatoes played a uniquely important role in buffering nutritional shortfalls during the transition crisis.

**Placebo test #2: Other crops and livestock after transition**. A remaining concern is that soil suitability may influence child health through unobserved channels correlated with potato consumption, rather than through home production itself. If such alternative channels were operative, their effects would plausibly persist beyond the transition period. To examine this possibility, we implement a second placebo test by re-estimating the baseline specification over the post-transition period, 2002–2017.[13]

Table 7 reports the corresponding estimates. In contrast to the transition period, the estimated coefficients on potato cultivation and its interaction with soil suitability are substantially smaller in magnitude and statistically insignificant throughout the post-transition years. Likewise, we find no evidence that the cultivation of other crops or livestock, or their interactions with suitability measures, is associated with children's height-for-age z-scores during this period.

These results indicate that the protective role of home potato production for child health was specific to the period of acute economic distress and diminished once market access and incomes recovered. Moreover, the absence of effects in the post-transition period strengthens the baseline interpretation: if soil suitability affected child health through alternative channels unrelated to potato consumption, such effects would be expected to persist at longer horizons, which we do not observe.

## 4.5 Instrumental Variables Evidence

This subsection provides complementary instrumental variables evidence addressing potential endogeneity in household potato cultivation. While the baseline results exploit within-child variation and rich fixed effects, households' decisions to grow potatoes may still reflect unobserved factors correlated with child health. To isolate plausibly exogenous variation in potato cultivation, we instrument household potato production with the soil suitability for potato cultivation.

[13]Average annual real GDP growth in Russia was 6.8% during 2002–2008 (prior to the global financial crisis), compared to −0.35% during 1994–2001. Source: IMF World Economic Outlook database.

**Table 7.** Placebo tests: Cultivation of other crops and livestock and child height after the transition, *2002–2017*

| Dependent variable: | Height-for-age z-score | | | | | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Grew potato | -0.067 | -0.046 | -0.043 | -0.088 | -0.108 | -0.069 | -0.107 |
| | (0.094) | (0.095) | (0.090) | (0.106) | (0.100) | (0.096) | (0.097) |
| Grew potato × Potato Suitability | 0.001 | 0.001 | 0.000 | 0.001 | 0.002 | 0.001 | 0.002 |
| | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) | (0.002) |
| Grew cabbage | | -0.067 | | | | | -0.084 |
| | | (0.122) | | | | | (0.147) |
| Grew cabbage × Cabbage Suitability | | 0.001 | | | | | 0.002 |
| | | (0.002) | | | | | (0.003) |
| Grew tomato | | | -0.075 | | | | -0.072 |
| | | | (0.053) | | | | (0.066) |
| Grew tomato × Tomato Suitability | | | 0.002 | | | | 0.002 |
| | | | (0.001) | | | | (0.001) |
| Grew beets | | | | 0.036 | | | 0.048 |
| | | | | (0.071) | | | (0.122) |
| Grew beets × Beet Suitability | | | | -0.002 | | | -0.001 |
| | | | | (0.002) | | | (0.002) |
| Grew carrot | | | | | 0.065 | | 0.095 |
| | | | | | (0.049) | | (0.102) |
| Grew carrot × Carrot Suitability | | | | | -0.002* | | -0.002 |
| | | | | | (0.001) | | (0.002) |
| Grew livestock | | | | | | -0.030 | -0.039 |
| | | | | | | (0.120) | (0.122) |
| Grew livestock × Potato Suitability | | | | | | 0.001 | 0.001 |
| | | | | | | (0.002) | (0.002) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Individual FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PSU × Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ individuals | 7,248 | 7,245 | 7,248 | 7,248 | 7,248 | 7,243 | 7,240 |
| $N$ obs | 27,218 | 27,203 | 27,215 | 27,213 | 27,215 | 27,190 | 27,165 |
| Within $R^2$ | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.006 |

*Note*: This table reports placebo tests for the post-transition period (2002–2017). The dependent variable is the child height-for-age z-score. Explanatory variables include indicators for the cultivation of potatoes, other crops (cabbage, tomatoes, beets, carrots), and livestock (cows, pigs, sheep and goats, poultry), as well as their interactions with the corresponding suitability indices. Control variables include the child's age in months, household size, and total household income. Individual and PSU × year fixed effects are included in all specifications. Household data are drawn from the RLMS, and crop suitability indices are taken from the FAO Global Agro-Ecological Zones database (GAEZ v4). Standard errors are clustered at the PSU level and reported in parentheses.

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

A limitation of this approach is that, when merging the RLMS with FAO agroecological data, the analysis is conducted at the level of 38 primary sampling units (PSUs). For this reason, we interpret the IV results as supportive evidence rather than as a replacement for the baseline estimates.

We estimate a two-stage least squares (2SLS) model. The first-stage equation is:

$$Potato_{irt} = \alpha_1 + \lambda_t + \beta_1 \cdot Suitability\,Index_r + \gamma_1 \mathbf{X}_{irt} + \varepsilon_{1,irt} \tag{5}$$

and the second-stage regression then appears as:

$$Y_{irt} = \alpha_2 + \lambda_t + \beta_2 \cdot \widehat{Potato}_{irt} + \gamma_2 \mathbf{X}_{irt} + \varepsilon_{2,irt} \tag{6}$$

where $Y_{irt}$ denotes the child height-for-age z-score. $Suitability\,Index_r$ is the logarithm of the soil suitability index for potato cultivation in region $r$. The vector $\mathbf{X}_{irt}$ includes the child's birth year and gender, mother's height, an indicator for whether the mother has more than a high school education, household size, an indicator for poverty status, annual household per capita expenditures, and an indicator for settlement type (urban/rural). Year fixed effects are included in both stages.

Table 8 reports the estimation results. Column (1) presents the first-stage estimates, column (2) reports the second-stage IV estimates, and column (3) shows the corresponding OLS estimate for comparison. We again split the soil suitability into 20 quintile bins and cluster standard errors at the suitability bin*year level to allow for correlation among observations facing similar agroecological conditions over time.

In the first stage, we obtain a positive and highly statistically significant estimate of the $\beta_1$ coefficient, indicating a strong positive relationship between soil suitability and the likelihood of household potato cultivation. The Kleibergen–Paap first-stage F-statistic is 31, well above the Stock–Yogo 10% critical value of 16.4, indicating that the instrument is strong.

In the second stage, we obtain a positive and highly statistically significant estimate of the $\beta_2$ coefficient, implying a strong association between instrumented potato cultivation and child height-

**Table 8.** Potato cultivation and child height: Instrumental variables estimates

| Dependent variable: | Potato | Height-for-age z-score | |
|---|---|---|---|
| | 1st stage | 2nd stage | OLS |
| | (1) | (2) | (3) |
| Suitability index | 0.065*** | | |
| | (0.011) | | |
| Potato (*predicted*) | | 1.771*** | 0.131** |
| | | (0.645) | (0.055) |
| Controls | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes |
| N obs | 3,822 | 3,644 | 3,644 |
| First-stage F-statistic | | 31.027 | |

*Note*: This table reports estimates of Equations (5) and (6). Column (1) presents first-stage estimates where the dependent variable is an indicator equal to one if the household grew potatoes during the previous year. Column (2) reports second-stage IV estimates for the child height-for-age z-score, and column (3) reports the corresponding OLS estimate. The instrument is the logarithm of the regional soil suitability index for potato cultivation. Control variables include the child's birth year and gender, mother's height, an indicator for maternal education beyond high school, household size, poverty status, annual household per capita expenditures, and settlement type (urban/rural). Year fixed effects are included in all specifications. The *First-stage F-statistic* is the Kleibergen-Paap rk LM statistic (the Stock-Yogo's 10% critical value is 16.4). Household data are drawn from the RLMS, and soil suitability indices are from the FAO Global Agro-Ecological Zones database (GAEZ v4).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. We split the soil suitability into 20 quintile bins and cluster standard errors at the suitability bin × year level (reported in parentheses).

for-age z-scores. In economic terms, a one-standard-deviation rise in the soil suitability index (18.16) increases the probability of potato cultivation by approximately $0.065 \times \ln(18.16) = 0.188$, or 18.8 percentage points. This increase in potato cultivation, in turn, raises the height-for-age z-score by about 0.334, which is roughly one-quarter of the z-score's standard deviation.

For comparison, the OLS estimate in column (3) is positive but substantially smaller in magnitude, consistent with attenuation due to selection into potato cultivation among poorer households. As a robustness check, we also cluster standard errors at the PSU × year level; results remain statistically significant, with a slightly lower but still acceptable first-stage F-statistic of 15.65.

Overall, the IV results reinforce the baseline findings by showing that plausibly exogenous variation in potato cultivation driven by agroecological suitability is associated with improved child health outcomes during the transition period.

# 5 Mechanisms: Evidence on Nutritional and Economic Channels

In this section, we examine the channels through which home potato cultivation affects child health during the transition crisis. Our discussion builds on the framework of Nunn & Qian (2011), who emphasize nutrition, income smoothing, and substitution across food sources as key mechanisms in periods of economic distress.

A natural channel is the direct nutritional effect of potato consumption. Potatoes are calorie-dense, storable, and rich in essential micronutrients, protein, and complex carbohydrates (Lang, 2001). In a context of food shortages and market disruptions, these characteristics make potatoes a potentially important contributor to household nutrition. At the same time, potato cultivation could also affect child health through alternative channels: (i) by generating income through sales; (ii) by freeing up household resources to purchase other food items; or (iii) by serving as a barter good when markets function poorly. We evaluate these alternative mechanisms in turn.

## 5.1 Selling potatoes

We first assess whether households relied on potato cultivation as a source of income. Descriptive evidence from the RLMS indicates that this channel is unlikely to be economically important: only about 6% of households that grew potatoes between 1994 and 2001 report selling them.

To formally test this mechanism, we extend the long-run specification in Section 4 by augmenting Equation (3) with measures of potato sales. Specifically, we estimate:

$$\begin{aligned} Height_{irt} = \alpha_t + \lambda_r + \beta_1 ET_{ir} &+ \delta_1 \cdot Grew\,Potato_{ir} \times ET_{ir} \\ &+ \delta_2 \cdot Grew\,Potato_{ir} \times ET_{ir} \times Suitability\ Index_r \\ &+ \theta_1 \cdot Sold\,Potato_{ir} \times ET_{ir} \\ &+ \theta_2 \cdot Sold\,Potato_{ir} \times ET_{ir} \times Suitability\ Index_r \\ &+ \gamma \mathbf{X}_{irt} + \epsilon_{irt} \end{aligned} \tag{7}$$

where $Grew\,Potato_{ir}$ denotes the number of years a household cultivated potatoes during 1994–2001, and $Sold\,Potato_{ir}$ captures the number of years in which potatoes were sold over the same period. All remaining variables and controls are defined as in the baseline long-run specification, and $\mathbf{X}_{irt}$ includes all the control variables from our baseline analysis and the full set of all necessary subproducts implied by the two triple interaction terms.

The estimates of equation (7) appear in Table 9 below. The coefficients on the interactions involving *Grew Potato* replicate the baseline long-run results from Table 4. In contrast, the coefficients on $Sold\,Potato \times ET$ and $Sold\,Potato \times ET \times Suitability\,Index$ are small and statistically insignificant across all specifications. These findings indicate that potato sales did not play a meaningful role in mitigating the long-run height penalties associated with early-childhood exposure to the transition.

## 5.2 Other potential mechanisms

**Savings used to purchase other food**. Another potential mechanism is that home production of potatoes reduced food expenditures, allowing households to reallocate resources toward other nutritious foods. To evaluate this channel, we re-estimate the baseline short-run specification in Equation (2), replacing child health outcomes with measures of food purchases and food expenditures.

Online Appendix Table XI reports the results. Panel A examines quantities purchased for a range of food items, including flour, bread, meat, dairy products, eggs, fish, and vegetables. Panel B considers expenditures on the same categories. Across all specifications, we find no statistically significant effects of potato cultivation or its interaction with soil suitability on purchases or expenditures for other food items (Columns 1–8). We also find no effect on the variety of foods purchased (Column 9). These results suggest that potato cultivation did not operate primarily through savings that were reallocated toward other market food consumption.

**Potatoes as a barter good**. Finally, we examine whether potatoes functioned as a barter commodity in local exchange networks during the transition. Using the same empirical framework,

**Table 9.** Testing income channels: potato sales and long-run adult height

| Dependent variable: | Self-reported adult height | | |
|---|---|---|---|
| Age at transition (*years*): | 0 | 0-1 | 0-2 |
| | (1) | (2) | (3) |
| Exposed to Transition (ET) | 0.257 | -0.463 | -0.798 |
| | (0.834) | (0.813) | (0.790) |
| Grew potato × ET | -2.254** | -1.558** | -1.347** |
| | (1.065) | (0.721) | (0.621) |
| Grew potato × ET × Suitability index | 0.046** | 0.032*** | 0.029*** |
| | (0.023) | (0.012) | (0.010) |
| Sold potato × ET | 1.920 | 0.668 | -0.358 |
| | (3.224) | (1.698) | (0.621) |
| Sold potato × ET × Suitability index | -0.035 | -0.007 | 0.022 |
| | (0.060) | (0.032) | (0.033) |
| Controls | ✓ | ✓ | ✓ |
| Linear time trend | ✓ | ✓ | ✓ |
| PSU FE | ✓ | ✓ | ✓ |
| $N$ obs | 9,479 | 9,479 | 9,479 |
| $R^2$ (adj.) | 0.511 | 0.511 | 0.512 |

*Note*: This table reports estimates of equation (7), where the dependent variable is self-reported adult height. The sample consists of adults observed in the RLMS after 2001. The specification extends the baseline long-run model by including interactions capturing whether households sold potatoes during 1994–2001, allowing for differential effects by exposure to the transition and soil suitability. Following Adserà et al. (2021), *ET* is an indicator for exposure to the transition during early childhood. Columns (1)–(3) consider three exposure definitions: born during the transition year (0), born or age one during the transition (0–1), and born, age one, or age two during the transition (0–2). *Grew potato* measures the number of years a household cultivated potatoes during 1994–2001, while *Sold potato* measures the number of years the household sold potatoes over the same period. *Suitability index* is the soil suitability index for potato cultivation. The data is sourced from the RLMS and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

we replace health outcomes with indicators for ownership and quantities of various food products.

The results, reported in Online Appendix Table XII, again show no systematic association between potato cultivation and possession of other food goods. Neither the main effect of potato cultivation nor its interaction with soil suitability is statistically significant. This evidence rules out barter as a quantitatively relevant channel.

Overall, the results in this section point to a direct nutritional mechanism: households that cultivated potatoes on more suitable land were better able to buffer children against nutritional deprivation during the transition, primarily through consumption rather than through income generation, substitution, or exchange.

# 6 External Validity

## 6.1 Kazakhstan Living Standards Measurement Survey (KLSMS)

To assess the external validity of our findings beyond Russia, we complement the RLMS analysis with data from the Kazakhstan Living Standards Measurement Survey (KLSMS), a nationally representative cross-sectional survey conducted by the World Bank in 1996. The survey covers 7,224 individuals from 1,996 households and was fielded during the early transition period, when households in Kazakhstan also faced substantial economic disruption.

A key advantage of the KLSMS relative to the RLMS is the availability of household geographic coordinates at the city or village level, yielding 135 distinct locations. This finer spatial resolution allows us to exploit cross-location variation in soil suitability for potato cultivation as an instrument for household potato production, despite the absence of panel data.

To characterize spatial variation in agricultural potential, Online Appendix Figure XI maps household locations together with potato soil suitability at the second administrative division level. Darker shading corresponds to higher suitability. To assign suitability more precisely to households, we construct a buffer with a 20-kilometer radius around the centroid of each location and aggregate grid-level suitability measures within each buffer.[14] The resulting sample includes 135 locations with suitability indices ranging from 0 to 73, with a mean of 34. Summary statistics are reported in Appendix Table A3.

Online Appendix Figure XII further shows that households located in areas with higher soil suitability are substantially more likely to engage in potato cultivation, providing empirical support for the relevance of soil suitability as a source of exogenous variation in potato production.

[14]The results are robust to alternative buffer radii of 15 and 25 kilometers.

## 6.2 Instrumental Variables Evidence from Kazakhstan

The finer geographic variation in the KLSMS data allows us to implement an instrumental variables strategy analogous to that used for Russia, despite the cross-sectional nature of the survey. We adjust the two-stage least squares approach (IV-2SLS) we employed in Section 4.5 as follows:

$$Potato_{il} = \alpha_1 + \beta_1 \cdot Suitability\,Index_l + \gamma_1 \mathbf{X}_{il} + \epsilon_{1,il} \tag{8}$$

$$Y_{il} = \alpha_2 + \beta_2 \cdot \widehat{Potato}_{il} + \gamma_2 \mathbf{X}_{il} + \epsilon_{2,il} \tag{9}$$

where $Potato_{il}$ is an indicator for whether household $i$ in location $l$ grew potatoes during the previous 12 months. The outcome $Y_{il}$ is the child's height-for-age z-score. The vector $\mathbf{X}_{il}$ includes the child's birth year, gender, mother's and father's height, household size, an indicator for poverty status, maternal education, household per capita expenditures, and settlement type (urban/rural).

Table 10 reports the estimates of Equations (8) and (9). Column (1) presents the first-stage results. We obtain a positive and highly statistically significant estimate of the $\beta_1$ coefficient, meaning that the soil suitability strongly predicts potato cultivation. Economically, a one-standard-deviation increase in suitability (17.83) raises the probability of growing potatoes by 14.3 percentage points, nearly one-third of the standard deviation of the potato cultivation indicator.

Columns (2)–(5) present the second-stage estimate. Across specifications, the coefficient on predicted potato cultivation is positive and statistically significant, indicating that exogenous increases in potato production induced by soil suitability are associated with improved child height outcomes. The first-stage F-statistics range from 25 to 29, comfortably exceeding conventional Stock–Yogo weak-instrument thresholds. For comparison, column (6) reports the OLS estimate, which is substantially smaller in magnitude and statistically weaker.

These IV-2SLS estimates should be interpreted as Local Average Treatment Effects (LATE), capturing the impact of potato cultivation for households whose production decisions respond to variation in soil suitability. The implied magnitudes are larger than those obtained in the RLMS panel analysis, consistent with the IV design isolating households facing particularly high returns to potato cultivation due to favorable agroecological conditions. As such, these estimates need

**Table 10.** Potato cultivation and child height in Kazakhstan: IV-2SLS estimates

| Dependent variable: | Potato | Height-for-age z-score | | | | |
|---|---|---|---|---|---|---|
| | 1st stage | 2nd stage | | | | OLS |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Suitability index | 0.008*** | | | | | |
| | (0.001) | | | | | |
| $\widehat{\text{Potato}}$ | | 1.047** | 1.005** | 0.840** | 0.751* | 0.087 |
| | | (0.421) | (0.409) | (0.418) | (0.419) | (0.151) |
| Mother's height | | | 0.036*** | 0.030*** | 0.030*** | 0.028*** |
| | | | (0.006) | (0.006) | (0.006) | (0.006) |
| Father's height | | | | 0.025*** | 0.026*** | 0.027*** |
| | | | | (0.009) | (0.009) | (0.008) |
| Birth year | | | | | 0.032*** | 0.034*** |
| | | | | | (0.011) | (0.011) |
| Other controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ obs | 1,539 | 1,539 | 1,496 | 1,361 | 1,361 | 1,361 |
| $R^2$ (adj.) | | 0.249 | 0.280 | 0.311 | 0.324 | 0.134 |
| First-stage F-stat | | 29.38 | 28.36 | 25.82 | 25.73 | |

*Note*: This table reports instrumental-variables (IV-2SLS) estimates of the relationship between household potato cultivation and child height-for-age z-scores, as implied by Equations (8) and (9), using data from the Kazakhstan Living Standards Measurement Survey (KLSMS, 1996). Column (1) reports the first-stage regression, where the dependent variable is an indicator for whether a household grew potatoes during the previous 12 months, instrumented by local soil suitability for potato cultivation. Columns (2)–(5) report second-stage estimates for child height-for-age z-scores under progressively richer sets of controls. Column (6) reports the corresponding OLS specification for comparison. The control variables include the child's gender and birth year, household size, an indicator for household poverty, mother's education, annual household per capita expenditures, settlement type (urban/rural), and, where indicated, mother's and father's height. The first-stage F-statistic corresponds to the Kleibergen–Paap rk statistic; the Stock–Yogo 10% critical value is 16.4. The data is sourced from the Kazakhstan Living Standards Measurement Survey (KLSMS) and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

not generalize to the population average but serve to illustrate the potential importance of home food production in comparable high-suitability settings.

# 7 Conclusion

Recurring economic crises and natural disasters continue to highlight the importance of understanding how households cope with large shocks, particularly those that threaten food security and child nutrition. The collapse of the Soviet Union provides a stark setting in which both household incomes and access to food markets deteriorated simultaneously, exposing children born in the early 1990s to substantial nutritional risk. This environment offers a unique opportunity to study household adaptation when formal safety nets and market access break down.

This paper examines an underexplored coping strategy in such settings: household subsistence production, focusing on home-grown potatoes. Combining detailed household data with high-resolution measures of agroecological suitability, we show that families located on land more suitable for potato cultivation were better able to protect child health during the transition crisis. Exploiting variation in soil suitability and household production decisions, we provide evidence that this buffering effect operated primarily through direct consumption of home-produced food, rather than through income generation, market substitution, or barter.

Our results indicate that, in the absence of reliable markets and state support, even small-scale subsistence agriculture can meaningfully stabilize nutritional intake and mitigate adverse health outcomes—particularly for young children during critical periods of growth. While home production is not a long-run development strategy, it can serve as an effective short-run insurance mechanism when households face severe and unexpected disruptions.

More broadly, this study contributes to the literature on household responses to large shocks by highlighting the role of agroecological endowments in shaping the effectiveness of coping strategies. The findings suggest that access to cultivable land and the feasibility of producing staple crops can condition household resilience during crises. Although our analysis focuses on the post-Soviet transition, the mechanisms we document are relevant for low- and middle-income countries experiencing food insecurity due to conflict, inflation, climate shocks, or market volatility. Understanding when and where subsistence production can effectively buffer nutritional risk remains an important area for future research and policy design.

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# Appendix

**Table A1.** Summary Statistics: Life in Transition Survey (LiTS)

| | Mean/Share | SD | Min | Max | N |
|---|---|---|---|---|---|
| Suitability index | 45.28 | 20.49 | 0.00 | 97.98 | 21,100 |
| Self-reported adult height in cm | 168.43 | 8.58 | 140.00 | 192.00 | 18,441 |
| Measured height in cm | 168.42 | 9.20 | 145.00 | 199.00 | 330 |
| Self-reported health status | 3.28 | 0.89 | 1.00 | 5.00 | 21,003 |
| Age | 47.72 | 17.41 | 18.00 | 95.00 | 21,100 |
| Below Age 4 | 0.08 | 0.28 | 0.00 | 1.00 | 21,100 |
| Below Age 5 | 0.10 | 0.30 | 0.00 | 1.00 | 21,100 |
| Below Age 6 | 0.12 | 0.33 | 0.00 | 1.00 | 21,100 |
| Gender | 0.40 | 0.49 | 0.00 | 1.00 | 21,100 |
| Urban | 0.57 | 0.50 | 0.00 | 1.00 | 21,100 |
| Religion | | | | | 20,936 |
| Atheistic/Agnostic/None | 7.39% | n/a | n/a | n/a | 1,547 |
| Buddhist | 0.25% | n/a | n/a | n/a | 53 |
| Jewish | 0.24% | n/a | n/a | n/a | 50 |
| Orthodox Christian | 43.21% | n/a | n/a | n/a | 9,047 |
| Catholic | 9.32% | n/a | n/a | n/a | 1,951 |
| Other Christian, including protestant | 5.26% | n/a | n/a | n/a | 1,101 |
| Muslim | 32.54% | n/a | n/a | n/a | 6,812 |
| Other | 1.79% | n/a | n/a | n/a | 375 |
| Mother's highest education completed | | | | | 20,200 |
| No degree/No education | 4.61% | n/a | n/a | n/a | 931 |
| Primary education | 12.71% | n/a | n/a | n/a | 2,567 |
| Lower secondary education | 18.77% | n/a | n/a | n/a | 3,791 |
| (Upper) secondary education | 31.72% | n/a | n/a | n/a | 6,408 |
| Post-secondary non-tertiary education | 17.58% | n/a | n/a | n/a | 3,552 |
| Tertiary education (not a university degree) | 8.64% | n/a | n/a | n/a | 1,745 |
| Bachelor's degree or more | 3.77% | n/a | n/a | n/a | 761 |
| Master's degree or PhD | 2.20% | n/a | n/a | na | 445 |

*Note*: This table reports summary statistics for the main variables used in the cross-country analysis in Section 2 based on household-level cross-country data from the Life in Transition Survey (LiTS). The sample includes respondents aged 18 and above from 14 post-Soviet countries. The *Suitability Index* measures agroecological suitability for potato cultivation at the primary sampling unit (PSU) level, based on FAO Global Agro-Ecological Zones (GAEZ v4). *Height* is self-reported unless otherwise noted. *Below Age 4*, *Below Age 5*, and *Below Age 6* indicate whether the respondent was younger than the respective age threshold during the country-specific transition year. The data is sourced from the LiTS and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

**Table A2.** Summary Statistics: Russian Longitudinal Monitoring Survey (RLMS)

| | Panel A: Sample of children for years 1994–2001 | | | | |
|---|---|---|---|---|---|
| | Mean | SD | Min | Max | N |
| Child's height-for-age z-score | -0.42 | 1.45 | -4.00 | 3.99 | 9,544 |
| Stunted | 0.14 | 0.35 | 0.00 | 1.00 | 9,544 |
| Self-reported height | 122.73 | 27.22 | 43.00 | 185.00 | 9,544 |
| Grew potatoes | 0.60 | 0.49 | 0.00 | 1.00 | 8,833 |
| Mother's height | 162.72 | 6.05 | 115.00 | 188.00 | 8,998 |
| Night lights | 17.93 | 19.79 | 0.19 | 62.04 | 9,544 |
| Number of family members | 4.24 | 1.45 | 2.00 | 13.00 | 9,113 |
| Child age in months | 95.78 | 48.90 | 0.00 | 213.00 | 9,544 |
| Age in years | 7.49 | 4.07 | 0.00 | 17.00 | 9,542 |
| Gender (1=male) | 0.51 | 0.51 | 0.00 | 1.00 | 9,544 |
| Urban | 0.67 | 0.47 | 0 | 1 | 9,544 |
| Household total real income | 7,948 | 17,499 | -4,754 | 1,040,413 | 9,113 |
| Suitability index | 49.31 | 18.16 | 0.00 | 77.36 | 9,544 |

| | Panel B: Sample of adults for years 2002–2017 | | | | |
|---|---|---|---|---|---|
| | Mean | SD | Min | Max | N |
| Self-reported height | 168.38 | 9.37 | 52.00 | 207.00 | 34,269 |
| ET | 0.01 | 0.10 | 0.00 | 1.00 | 35,437 |
| ET1 | 0.02 | 0.15 | 0.00 | 1.00 | 35,437 |
| ET2 | 0.04 | 0.20 | 0.00 | 1.00 | 35,437 |
| Potato | 2.55 | 2.27 | 0.00 | 6.00 | 10,603 |
| Mother's height | 161.78 | 6.44 | 130.00 | 187.00 | 6,668 |
| Number of family members | 3.32 | 1.61 | 1.00 | 16.00 | 32,877 |
| Age | 42.17 | 17.62 | 21.00 | 104.00 | 35,429 |
| Gender (1=male) | 0.44 | 0.50 | 0.00 | 1.00 | 35,437 |
| Urban | 0.75 | 0.43 | 0.00 | 1.00 | 35,437 |
| Household total real income | 14,176 | 21,085 | -2,315 | 1,015,622 | 32,877 |
| Suitability index | 52.80 | 17.78 | 0.00 | 77.36 | 35,437 |

*Note*: This table reports summary statistics for the main variables used in the individual-level analysis for Russia based on the Russian Longitudinal Monitoring Survey (RLMS) in Sections 4 and 5. Panel A describes the sample of children observed during the transition period (1994–2001), used in the short-run child health analysis. Panel B describes the sample of adults observed after the transition (2002–2017), used in the long-run adult height analysis. *Child's height-for-age z-score* is a child health measure reflecting relative height conditional on age and gender, computed as the standardized difference between the child's observed height (as reported in the survey) and the median height of the international reference population of the same age (in months) and gender. *Stunted* is an indicator equal to one if a child's height-for-age z-score is below $-2$ standard deviations relative to the WHO reference population. *Grew potatoes* indicates whether the household reported cultivating potatoes during the previous 12 months. *Potato* measures the number of years a household grew potatoes between 1994 and 2001. *ET*, *ET1*, and *ET2* follow Adserà et al. (2021) and indicate whether an individual was born during the transition year, born or aged one during the transition year, or born or aged up to two during the transition year, respectively. The *Suitability index* measures agroecological suitability for potato cultivation at the primary sampling unit (PSU) level and is constructed using FAO Global Agro-Ecological Zones (GAEZ v4). The data is sourced from the RLMS from 1994 to 2001 and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

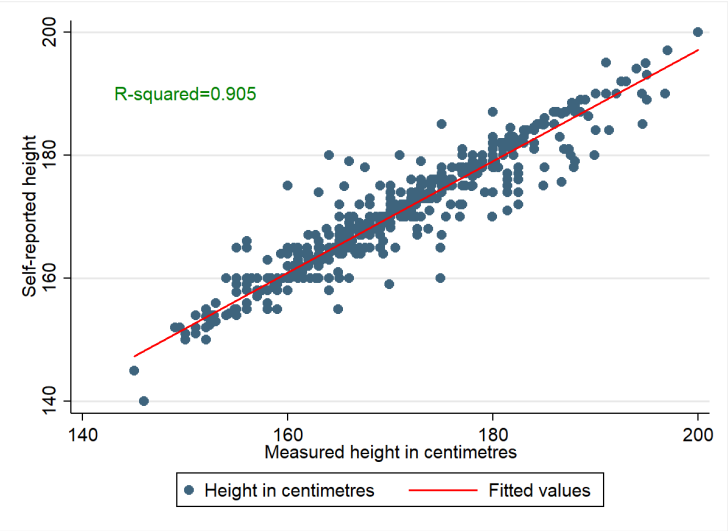
**Table A3.** Summary statistics: Kazakhstan Living Standards Measurement Survey (KLSMS)

| | Mean | SD | Min | Max | N |
|---|---|---|---|---|---|
| Child's height-for-age z-score | -0.85 | 1.51 | -3.99 | 3.89 | 2,192 |
| Grew potato | 0.72 | 0.45 | 0.00 | 1.00 | 1,579 |
| Age | 10.84 | 4.62 | 1.00 | 18.00 | 2192 |
| Gender (1=male) | 0.53 | 0.50 | 0.00 | 1.00 | 2,192 |
| household size | 4.86 | 1.55 | 1.00 | 11.00 | 2,192 |
| Poor | 0.63 | 0.48 | 0.00 | 1.00 | 2,192 |
| Rural | 0.55 | 0.50 | 0.00 | 1.00 | 2,192 |
| Mother has above high school education | 0.08 | 0.27 | 0.00 | 1.00 | 2,192 |
| Mother's height | 161.64 | 6.99 | 68.00 | 185.00 | 2,120 |
| Father's height | 171.57 | 6.91 | 124.00 | 193.00 | 1,858 |
| Household per capita expenditures | 51,516 | 36,087 | 2209.79 | 328,962 | 2,192 |
| Suitability index | 33.45 | 17.83 | 0.00 | 73.01 | 2134 |

*Note*: This table reports summary statistics for the main variables used in the individual-level analysis for Kazakhstan based on the Kazakhstan Living Standards Measurement Survey (KLSMS, 1996) in Section 6. The sample consists of children aged 1–18 and their households. *Child's height-for-age z-score* is a child health measure reflecting relative height conditional on age and gender, computed as the standardized difference between the child's observed height (as reported in the survey) and the median height of the international reference population of the same age (in months) and gender. *Grew potato* is an indicator equal to one if the household reported cultivating potatoes during the previous 12 months. *Poor* indicates whether the household falls below the national poverty threshold. *Suitability index* measures agroecological suitability for potato cultivation at the location level and is constructed using FAO Global Agro-Ecological Zones (GAEZ v4) data aggregated within a 20-kilometer buffer around household location centroids. The data is sourced from the Kazakhstan Living Standards Measurement Survey (KLSMS) and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

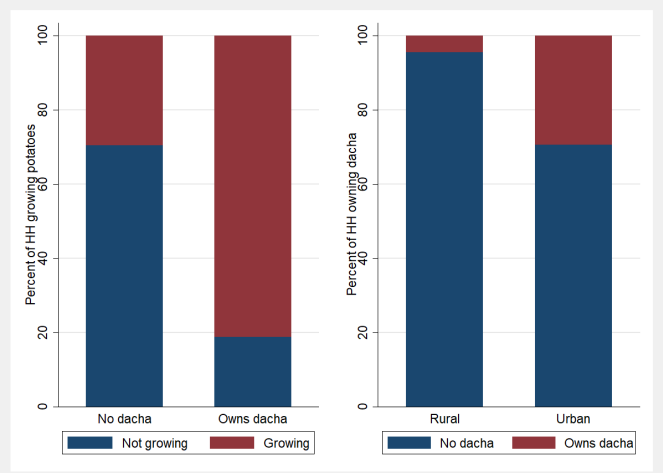
# Online Appendix

**Figure I.** Self-reported and measured height in 14 post-Soviet countries



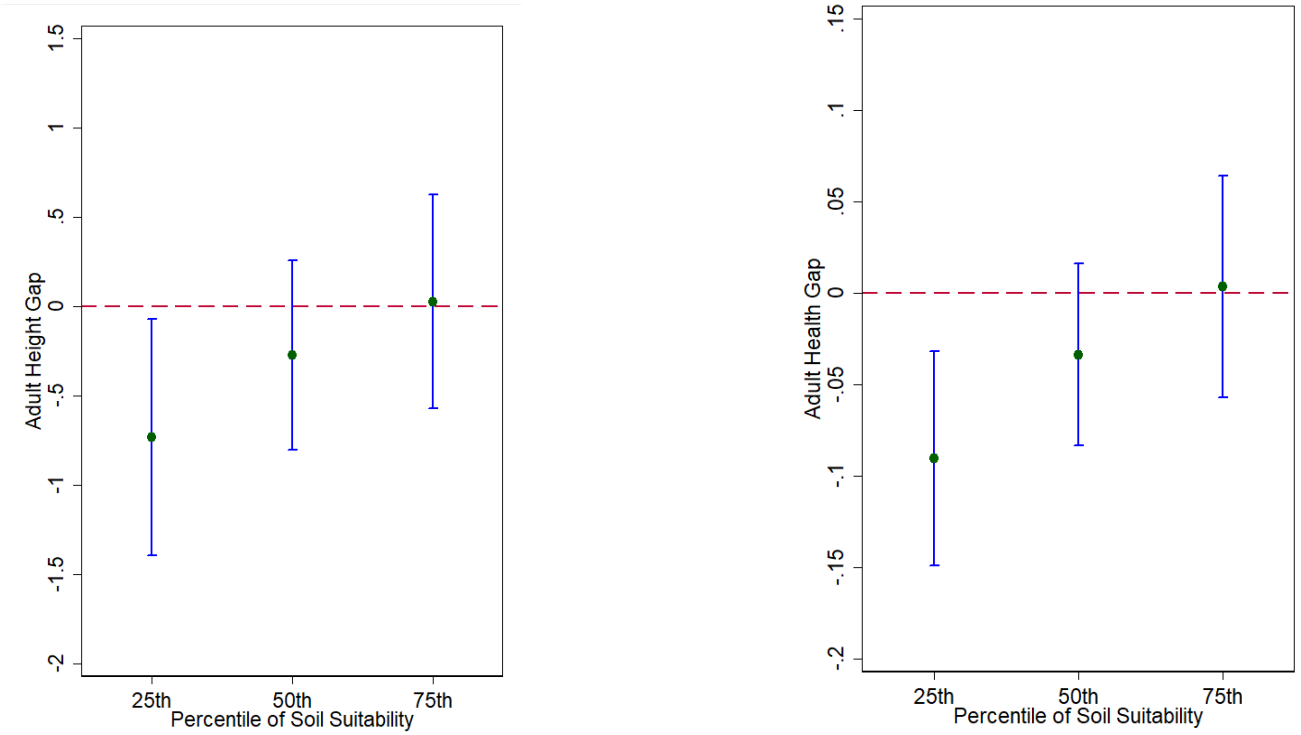

*Note*: This figure plots self-reported height against measured height (in centimeters) for the subsample of respondents for whom both measures are available. The solid line shows the fitted values from a linear regression of self-reported height on measured height. The data is sourced from the 2016 Life in Transition Survey (LiTS).

**Figure II.** Dacha ownership, potato cultivation, and urban residence in Russia




*Note*: This figure illustrates the strong association between dacha ownership and household potato cultivation, as over 80% of households owning a summerhouse (*dacha*) report growing potatoes (left panel). Dacha ownership is substantially more prevalent among households whose primary residence is located in urban areas (right panel). Together, these patterns indicate that potato cultivation during the transition was closely linked to access to household plots rather than to rural residence per se. The data is sourced from the Russian Longitudinal Monitoring Survey (RLMS).

**Figure III.** Cohort gaps in adult height and health by land suitability for potato cultivation in 14 post-Soviet countries

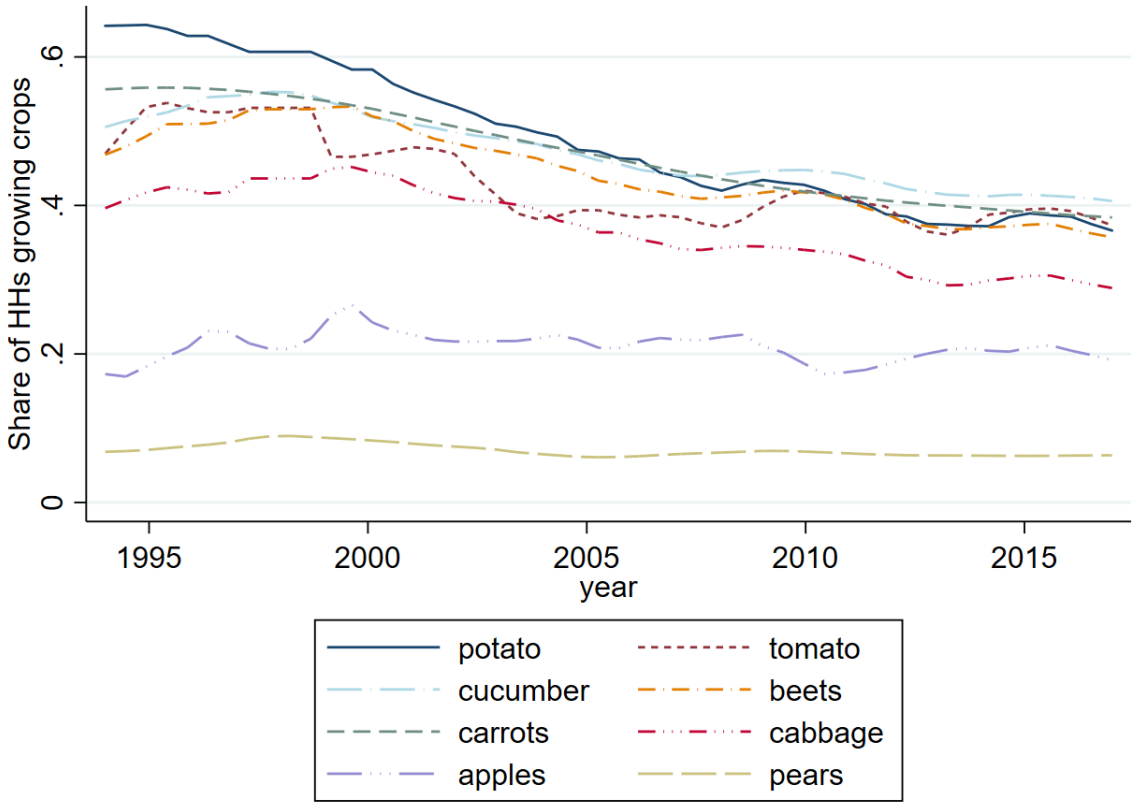



(a) Height gap

(b) Health gap

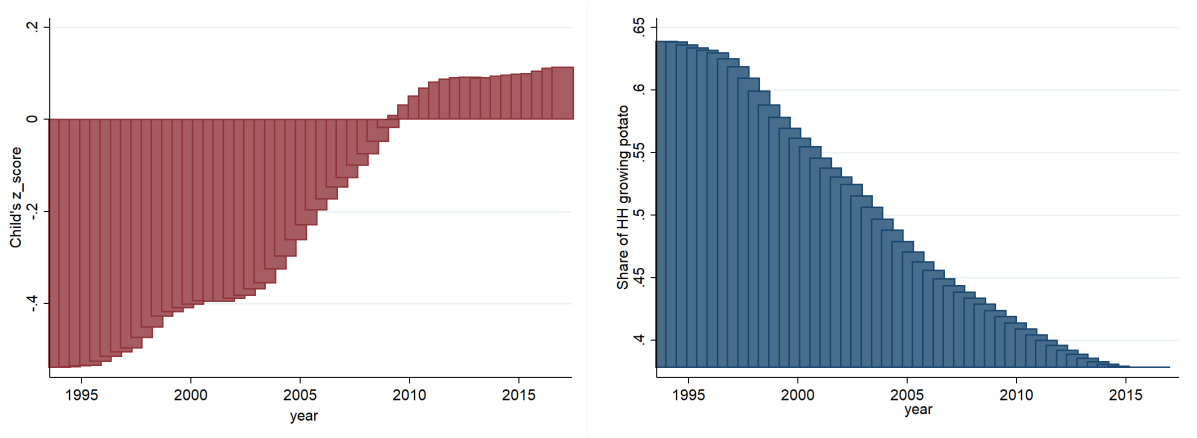
*Note*: This figure plots marginal effects (with 95% confidence intervals) of being younger than five years old during the transition year on adult outcomes, evaluated at the 25th, 50th, and 75th percentiles of the regional soil suitability distribution for potato cultivation. Panel (a) reports effects on adult height, and Panel (b) reports effects on self-reported adult health. The estimates are based on columns (2) and (4) of Table 1. The data is sourced from the Life in Transition Survey (LiTS, household-level cross-country data) and the Food and Agriculture Organization's Global Agro-Ecological Zones database (GAEZ v4).

**Figure IV.** Household crop cultivation in Russia over time




*Note*: This figure plots the share of households reporting the cultivation of selected crops in Russia between 1995 and 2015. The figure highlights the predominance of potato cultivation relative to other crops throughout the transition and post-transition periods. The data is sourced from the Russian Longitudinal Monitoring Survey (RLMS).

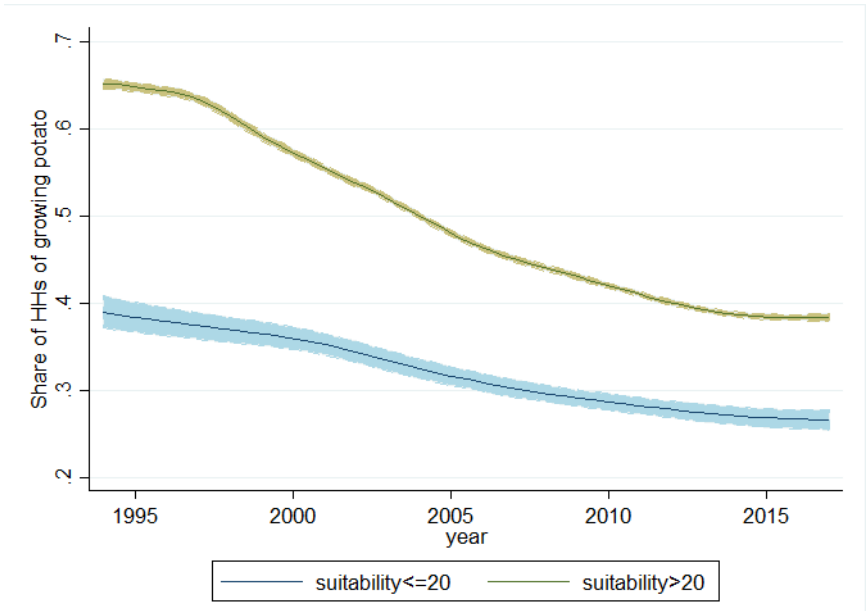
**Figure V.** Child height-for-age and household potato cultivation in Russia, by year




(a) Child height-for-age z-score (b) The share of households growing potatoes

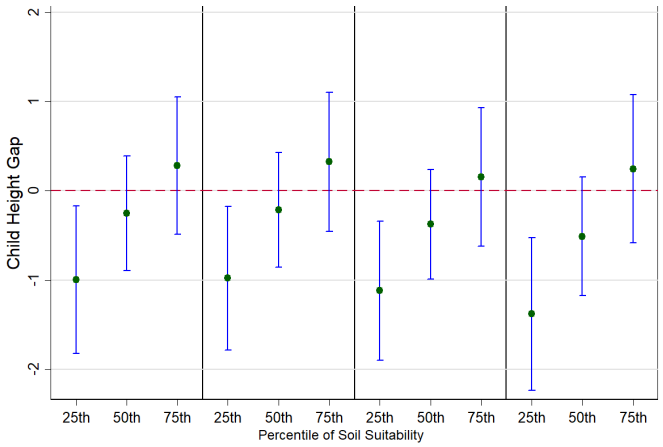
*Note*: This figure depicts the average height-for-age z-score of children (*a*) and the share of households reporting potato cultivation (*b*) during 1994-2017. Height-for-age z-scores are computed as standardized deviations from the World Health Organization (WHO) reference population by age and gender, using self-reported height. The data is sourced from the Russian Longitudinal Monitoring Survey (RLMS).

**Figure VI.** Household potato cultivation by land suitability



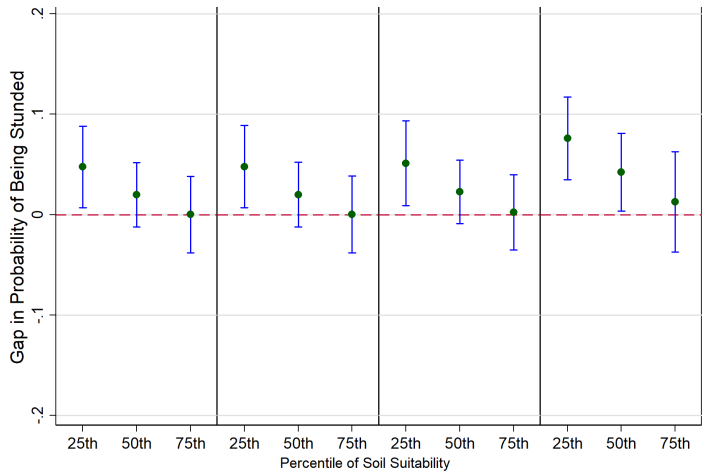

*Note*: This figure plots kernel-weighted local polynomial estimates of the probability that a household grows potatoes, by year and soil suitability for potato cultivation. Estimates are obtained using an Epanechnikov kernel. Higher suitability values correspond to more favorable agroecological conditions. The data is sourced from the Russian Longitudinal Monitoring Survey (RLMS).

**Figure VII.** Estimated child height-for-age gaps across the distribution of soil suitability



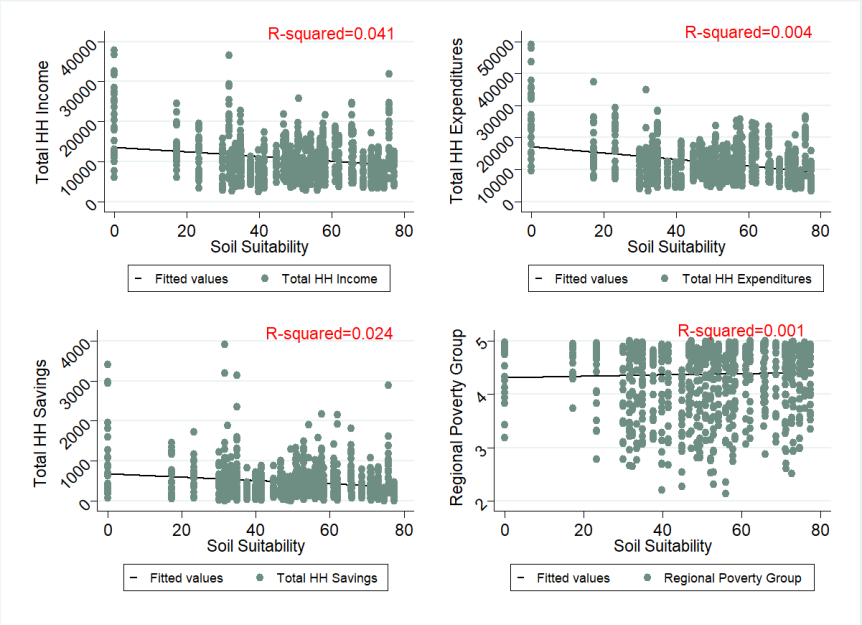

*Note*: This figure plots the estimated marginal effects of potato cultivation on children's height-for-age z-scores, evaluated at the 25th, 50th, and 75th percentiles of the distribution of soil suitability for potato cultivation across primary sampling units (PSUs). Vertical bars indicate 95% confidence intervals. Estimates are computed using equation (2), based on columns (1)–(3) of Table 2 for the full sample and column (6) for the *Use lands* subsample. The data is sourced from the RLMS from 1994 to 2001 and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

**Figure VIII.** Estimated child stunting gaps across the distribution of soil suitability



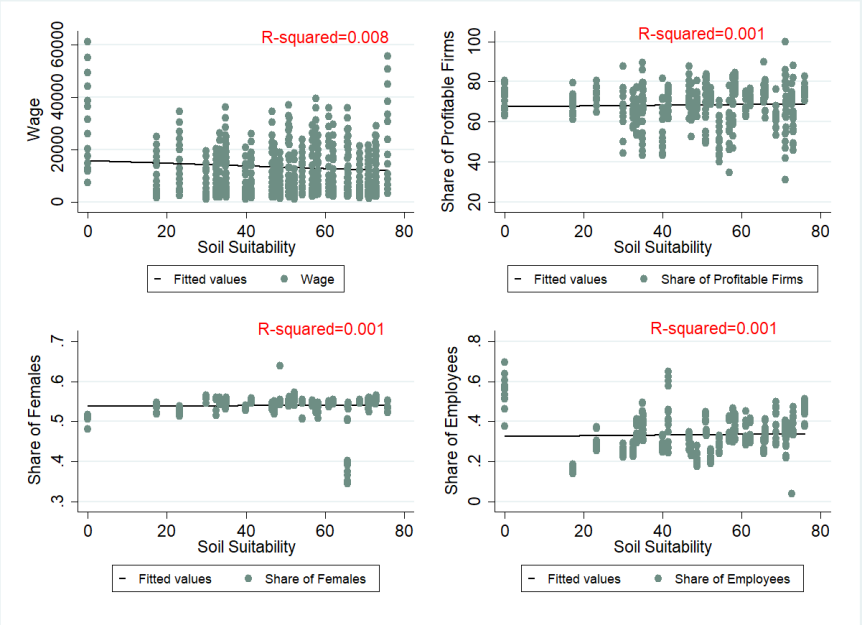

*Note*: This figure plots the estimated marginal effects of potato cultivation on the probability that a child is stunted (height-for-age z-score below $-2$ standard deviations), evaluated at the 25th, 50th, and 75th percentiles of the distribution of soil suitability for potato cultivation across primary sampling units (PSUs). Vertical bars indicate 95% confidence intervals. Estimates are computed using equation (2), based on columns (1)–(3) of Table 3 for the full sample and column (6) for the *Use lands* subsample. The data is sourced from the RLMS from 1994 to 2001 and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

**Figure IX.** Household characteristics by soil suitability for potato cultivation



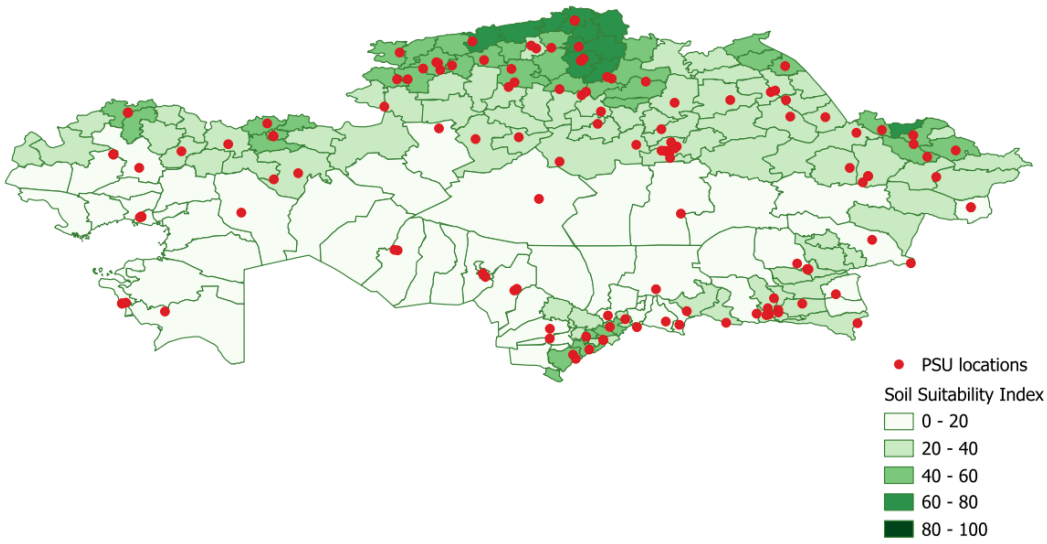

*Note*: This figure plots average household characteristics—total income, total expenditures, total savings, and an indicator for being below the poverty threshold—against the soil suitability index for potato cultivation. The averages are computed across households observed in the Russian Longitudinal Monitoring Survey (RLMS). Data on soil suitability is sourced from the FAO Global Agro-Ecological Zones (GAEZ v4).

**Figure X.** PSU-level characteristics by soil suitability for potato cultivation



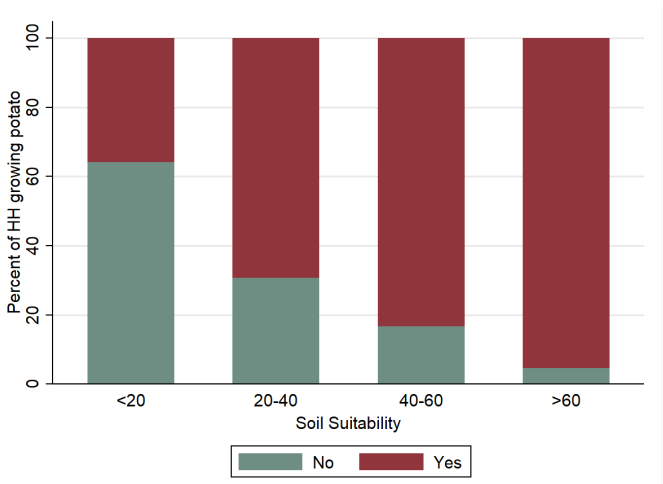

*Note*: This figure plots primary sampling unit (PSU)–level characteristics—including average wages, the share of profitable firms, the share of female residents, and the share of employees—against the soil suitability index for potato cultivation. PSU-level characteristics are drawn from Multistat (http://multistat.ru/), while soil suitability measures are obtained from the FAO Global Agro-Ecological Zones (GAEZ v4).

**Figure XI.** Household locations and soil suitability for potato cultivation in Kazakhstan




*Note*: This map displays spatial variation in the soil suitability index for potato cultivation at the second administrative division level in Kazakhstan, together with the locations of households surveyed in the Kazakhstan Living Standards Measurement Survey (KLSMS). Higher suitability values are indicated by darker shading. Household locations are marked by red dots and are distributed across all regions of the country, spanning the full range of soil suitability values. Soil suitability data is sourced from the FAO Global Agro-Ecological Zones (GAEZ v4), and household data is from the KLSMS 1996.

**Figure XII.** Potato cultivation by soil suitability in Kazakhstan




*Note*: This figure reports binned means of potato cultivation by soil suitability for potato production. The soil suitability index is divided into four bins: below 20, 20–40, 40–60, and above 60. For each bin, the figure shows the proportion of households that grow potatoes and the proportion that do not grow potatoes. The monotonic increase in potato cultivation across suitability bins illustrates the relevance of soil suitability for potato production. The data is sourced from the Kazakhstan Living Standards Measurement Survey (KLSMS) 1996, with soil suitability measures obtained from the FAO Global Agro-Ecological Zones (GAEZ v4).

**Table I.** Early-childhood exposure to the transition and adult outcomes: Alternative age cutoffs

| | Height (cm) | | | Health (1–5) | | |
|---|---|---|---|---|---|---|
| $k$ (years): | 4 | 5 | 6 | 4 | 5 | 6 |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Below Age $k$ | -1.191* | -1.747*** | -1.439** | -0.167*** | -0.210*** | -0.208*** |
| | (0.704) | (0.635) | (0.591) | (0.048) | (0.055) | (0.055) |
| Below Age $k\times$ Suitability index | 0.012 | 0.024** | 0.021* | 0.002** | 0.003** | 0.003*** |
| | (0.013) | (0.012) | (0.011) | (0.001) | (0.001) | (0.001) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Country FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Country-specific time trends | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ obs | 7,862 | 7,862 | 7,862 | 9,178 | 9,178 | 9,178 |
| Districts | 482 | 482 | 482 | 485 | 485 | 485 |
| Within $R^2$ | 0.329 | 0.329 | 0.329 | 0.181 | 0.181 | 0.181 |

*Note*: This table reports estimates of Equation (1) using alternative definitions of early-childhood exposure to the transition. *Below Age 4*, *Below Age 5*, and *Below Age 6* indicate whether an individual was aged four or younger, five or younger, or six or younger during the country-specific transition year, respectively. The *Suitability index* measures agroecological suitability for potato cultivation. Columns (1)–(3) use adult height (cm) as the outcome, while columns (4)–(6) use current self-reported health measured on a 1–5 scale. All specifications control for age, gender, religion, mother's education, and soil suitability for other crops (cabbage, carrots, tomatoes, and beets), and include country fixed effects and country-specific linear birth-cohort trends. The sample consists of individuals aged 21–55 (18–55 for health) in 14 post-Soviet countries observed in LiTS 2016. The data is sourced from the LiTS survey (household-level cross-country data) and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

**Table II.** Adult height and health by early-childhood exposure to the transition: Alternative age ranges

| Age: | 21–65 | | 18–65 | | 21–99 | | 18–99 | |
|---|---|---|---|---|---|---|---|---|
| | Height (cm) | | Health (1–5) | | Height (cm) | | Health (1–5) | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Below Age 5 | -1.396** | -1.675*** | -0.242*** | -0.214*** | -1.814*** | -1.933*** | -0.255*** | -0.187*** |
| | (0.612) | (0.630) | (0.058) | (0.059) | (0.613) | (0.605) | (0.058) | (0.057) |
| Suitability index | -0.002 | -0.001 | -0.000 | 0.000 | -0.010 | -0.009 | 0.000 | 0.000 |
| | (0.022) | (0.023) | (0.003) | (0.003) | (0.020) | (0.020) | (0.002) | (0.002) |
| Below Age 5 × Suitability index | 0.017 | 0.023** | 0.004*** | 0.003*** | 0.016 | 0.021* | 0.004*** | 0.003** |
| | (0.011) | (0.012) | (0.001) | (0.001) | (0.012) | (0.011) | (0.001) | (0.001) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Country FE | | ✓ | | ✓ | | ✓ | | ✓ |
| Country-specific time trends | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ obs | 7,862 | 7,862 | 9,178 | 9,178 | 9,734 | 9,734 | 11,277 | 11,277 |
| Districts | 482 | 482 | 485 | 485 | 482 | 482 | 485 | 485 |

*Note*: This table presents estimates of Equation (1) using alternative adult age ranges in the LiTS 2016 data. Columns (1)–(4) restrict the sample to individuals aged 21–65 (18–65 for health), while columns (5)–(8) expand the sample to individuals aged 21–99 (18–99 for health). The dependent variables are adult height in centimeters and current self-reported health measured on a 1–5 scale. *Below Age 5* indicates whether an individual was five years old or younger during the country-specific transition year. *Suitability Index* measures agroecological suitability for potato cultivation. All specifications control for age, gender, religion, mother's education, and soil suitability for other crops (cabbage, carrots, tomatoes, and beets). Country fixed effects and country-specific linear birth-cohort trends are included as indicated. The data is sourced from the LiTS survey (household-level cross-country data) and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

**Table III.** Short-run relationship between potato cultivation and child height-for-age z-score: Robustness to clustering at the PSU*year level

| Dependent variable: | Height-for-age z-score | | | | |
|---|---|---|---|---|---|
| | Full sample | | | | Use lands |
| | (1) | (2) | (3) | (4) | (5) |
| Potato | -0.479** | -0.482** | -0.567*** | -0.480** | -0.632** |
| | (0.209) | (0.207) | (0.214) | (0.243) | (0.292) |
| Potato × Suitability index | 0.009** | 0.009** | 0.010** | 0.009** | 0.011** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.005) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| Individual FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | | ✓ | | | ✓ |
| PSU × Year FE | | | ✓ | | |
| Job occupation × Year FE | | | | ✓ | |
| $N$ individuals | 2,642 | 2,642 | 2,642 | 2,642 | 1,937 |
| $N$ obs | 5,426 | 5,426 | 5,426 | 5,426 | 3,753 |
| Within $R^2$ | 0.007 | 0.005 | 0.006 | 0.010 | 0.006 |
| Mean Suitability | 49.2 | 49.2 | 49.2 | 49.2 | 49.2 |

*Note*: This table reports estimates of Equation (2), where the dependent variable is the child height-for-age z-score. The indicator *Potato* equals one if the household grew potatoes in the previous year. The interaction term captures how the association between potato cultivation and child height varies with the regional soil *Suitability index* for potato cultivation. Columns (1) to (4) use the full sample of households, while column (5) restricts the sample to households that explicitly report using land for home agricultural production. Control variables include the child's age in months, household size, total household income, and PSU-level annual night-time lights. The sample covers the transition period 1994–2001. Household data are drawn from the RLMS, and soil suitability indices are from the FAO Global Agro-Ecological Zones database (GAEZ v4).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU × year level and reported in parentheses.

**Table IV.** Short-run relationship between potato cultivation and the probability of stunting: Robustness to clustering at the PSU*year level

| Dependent variable: | $\mathbb{1}\{Height\text{-}for\text{-}age\ z\text{-}score < -2\}$ | | | | |
|---|---|---|---|---|---|
| | Full sample | | | | Use lands |
| | (1) | (2) | (3) | (4) | (5) |
| Potato | 0.108** | 0.109** | 0.113** | 0.108** | 0.158** |
| | (0.053) | (0.053) | (0.055) | (0.052) | (0.067) |
| Potato × Suitability index | -0.002* | -0.002* | -0.002* | -0.002* | -0.002* |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| Individual FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | | ✓ | | | ✓ |
| PSU × Year FE | | | ✓ | | |
| Job occupation × Year FE | | | | ✓ | |
| $N$ individuals | 2,642 | 2,642 | 2,642 | 2,642 | 1,937 |
| $N$ obs | 5,426 | 5,426 | 5,426 | 5,426 | 3,753 |
| Within $R^2$ | 0.007 | 0.003 | 0.002 | 0.002 | 0.003 |
| Mean Suitability | 49.7 | 49.7 | 49.7 | 49.7 | 49.7 |

*Note*: This table reports estimates of Equation (2), where the dependent variable is an indicator equal to one if the child's height-for-age z-score is below $-2$ standard deviations. The indicator *Potato* equals one if the household grew potatoes in the previous year. The interaction term captures how the association between potato cultivation and stunting varies with the regional soil *Suitability index* for potato cultivation. Columns (1) to (4) use the full sample of households, while column (5) restricts the sample to households that report using land for home agricultural production. Control variables include the child's age in months, household size, total household income, and PSU-level annual night-time lights. The sample covers the transition period 1994–2001. Household data are drawn from the RLMS, and soil suitability indices are from the FAO Global Agro-Ecological Zones database (GAEZ v4). Standard errors are clustered at the PSU level and reported in parentheses.

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU × year level and reported in parentheses.

**Table V.** Short-run relationship between potato cultivation and child height-for-age z-score: Robustness to clustering at the soil suitability bin*level

| Dependent variable: | Height-for-age z-score | | | | |
|---|---|---|---|---|---|
| | Full sample | | | | Use lands |
| | (1) | (2) | (3) | (4) | (5) |
| Potato | -0.479** | -0.482** | -0.567*** | -0.480** | -0.632*** |
| | (0.195) | (0.196) | (0.199) | (0.224) | (0.231) |
| Potato × Suitability index | 0.009** | 0.009** | 0.010*** | 0.009** | 0.011** |
| | (0.003) | (0.003) | (0.004) | (0.004) | (0.004) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| Individual FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | | ✓ | | | ✓ |
| PSU × Year FE | | | ✓ | | |
| Job occupation × Year FE | | | | ✓ | |
| $N$ individuals | 2,642 | 2,642 | 2,642 | 2,642 | 1,937 |
| $N$ obs | 5,426 | 5,426 | 5,426 | 5,426 | 3,753 |
| Within $R^2$ | 0.007 | 0.010 | 0.066 | 0.031 | 0.011 |
| Mean Suitability | 49.7 | 49.7 | 49.7 | 49.7 | 49.7 |

*Note*: This table reports estimates of Equation (2), where the dependent variable is the child height-for-age z-score. The indicator *Potato* equals one if the household grew potatoes in the previous year. The interaction term captures how the association between potato cultivation and child height varies with the regional soil *Suitability index* for potato cultivation. Columns (1) to (4) use the full sample of households, while column (5) restricts the sample to households that explicitly report using land for home agricultural production. Control variables include the child's age in months, household size, total household income, and PSU-level annual night-time lights. The sample covers the transition period 1994–2001. Household data are drawn from the RLMS, and soil suitability indices are from the FAO Global Agro-Ecological Zones database (GAEZ v4).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. We split the soil suitability into 20 quintile bins and cluster standard errors at the suitability bin × year level (reported in parentheses).

**Table VI.** Short-run relationship between potato cultivation and the probability of stunting: Robustness to clustering at the soil suitability bin*year level

| Dependent variable: | $\mathbb{1}\{Height\text{-}for\text{-}age\ z\text{-}score < -2\}$ | | | | |
|---|---|---|---|---|---|
| | Full sample | | | | Use lands |
| | (1) | (2) | (3) | (4) | (5) |
| Potato | 0.108* | 0.109* | 0.113** | 0.108** | 0.158** |
| | (0.055) | (0.055) | (0.054) | (0.047) | (0.069) |
| Potato × Suitability index | -0.002* | -0.002* | -0.002* | -0.002* | -0.002* |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| Individual FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | | ✓ | | | ✓ |
| PSU × Year FE | | | ✓ | | |
| Job occupation × Year FE | | | | ✓ | |
| $N$ individuals | 2,642 | 2,642 | 2,642 | 2,642 | 1,937 |
| $N$ obs | 5,426 | 5,426 | 5,426 | 5,426 | 3,753 |
| Within $R^2$ | 0.007 | 0.008 | 0.054 | 0.026 | 0.008 |
| Mean Suitability | 49.7 | 49.7 | 49.7 | 49.7 | 49.7 |

*Note*: This table reports estimates of Equation (2), where the dependent variable is an indicator equal to one if the child's height-for-age z-score is below $-2$ standard deviations. The indicator *Potato* equals one if the household grew potatoes in the previous year. The interaction term captures how the association between potato cultivation and stunting varies with the regional soil *Suitability index* for potato cultivation. Columns (1) to (4) use the full sample of households, while column (5) restricts the sample to households that report using land for home agricultural production. Control variables include the child's age in months, household size, total household income, and PSU-level annual night-time lights. The sample covers the transition period 1994–2001. Household data are drawn from the RLMS, and soil suitability indices are from the FAO Global Agro-Ecological Zones database (GAEZ v4). Standard errors are clustered at the PSU level and reported in parentheses.

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. We split the soil suitability into 20 quintile bins and cluster standard errors at the suitability bin × year level (reported in parentheses).

**Table VII.** Short-run relationship between potato cultivation and child height-for-age z-score: Robustness to clustering at the individual level

| Dependent variable: | Height-for-age z-score | | | | |
|---|---|---|---|---|---|
| | Full sample | | | | Use lands |
| | (1) | (2) | (3) | (4) | (5) |
| Potato | -0.479** | -0.482** | -0.567*** | -0.480** | -0.632** |
| | (0.206) | (0.204) | (0.209) | (0.224) | (0.258) |
| Potato × Suitability index | 0.009** | 0.009** | 0.010** | 0.009** | 0.011** |
| | (0.004) | (0.004) | (0.004) | (0.004) | (0.005) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| Individual FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | | ✓ | | | ✓ |
| PSU × Year FE | | | ✓ | | |
| Job occupation × Year FE | | | | ✓ | |
| $N$ individuals | 2,642 | 2,642 | 2,642 | 2,642 | 1,937 |
| $N$ obs | 5,426 | 5,426 | 5,426 | 5,426 | 3,753 |
| Within $R^2$ | 0.007 | 0.010 | 0.066 | 0.031 | 0.011 |
| Mean Suitability | 50.6 | 50.6 | 50.6 | 50.6 | 50.6 |

*Note*: This table reports estimates of Equation (2), where the dependent variable is the child height-for-age z-score. The indicator *Potato* equals one if the household grew potatoes in the previous year. The interaction term captures how the association between potato cultivation and child height varies with the regional soil *Suitability index* for potato cultivation. Columns (1) to (4) use the full sample of households, while column (5) restricts the sample to households that explicitly report using land for home agricultural production. Control variables include the child's age in months, household size, total household income, and PSU-level annual night-time lights. The sample covers the transition period 1994–2001. Household data are drawn from the RLMS, and soil suitability indices are from the FAO Global Agro-Ecological Zones database (GAEZ v4).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the individual level and reported in parentheses.

**Table VIII.** Short-run relationship between potato cultivation and the probability of stunting: Robustness to clustering at the individual level

| Dependent variable: | $\mathbb{1}\{Height\text{-}for\text{-}age\ z\text{-}score < -2\}$ | | | | |
|---|---|---|---|---|---|
| | Full sample | | | | Use lands |
| | (1) | (2) | (3) | (4) | (5) |
| Potato | 0.108* | 0.109** | .113** | 0.108*** | 0.158*** |
| | (0.058) | (0.046) | (0.052) | (0.039) | (0.046) |
| Potato × Suitability index | -0.002* | -0.002* | -0.002* | -0.002** | -0.002** |
| | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ |
| Individual FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | | ✓ | | | ✓ |
| PSU × Year FE | | | ✓ | | |
| Job occupation × Year FE | | | | ✓ | |
| $N$ individuals | 2,642 | 2,642 | 2,642 | 2,642 | 1,937 |
| $N$ obs | 5,426 | 5,426 | 5,426 | 5,426 | 3,753 |
| Within $R^2$ | 0.007 | 0.008 | 0.054 | 0.026 | 0.008 |
| Mean Suitability | 50.6 | 50.6 | 50.6 | 50.6 | 50.6 |

*Note*: This table reports estimates of Equation (2), where the dependent variable is an indicator equal to one if the child's height-for-age z-score is below $-2$ standard deviations. The indicator *Potato* equals one if the household grew potatoes in the previous year. The interaction term captures how the association between potato cultivation and stunting varies with the regional soil *Suitability index* for potato cultivation. Columns (1) to (4) use the full sample of households, while column (5) restricts the sample to households that report using land for home agricultural production. Control variables include the child's age in months, household size, total household income, and PSU-level annual night-time lights. The sample covers the transition period 1994–2001. Household data are drawn from the RLMS, and soil suitability indices are from the FAO Global Agro-Ecological Zones database (GAEZ v4). Standard errors are clustered at the PSU level and reported in parentheses.

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the individual level and reported in parentheses.

**Table IX.** Household characteristics and potato cultivation across land suitability

| Dependent variable: | Panel A | | | | |
|---|---|---|---|---|---|
| | Household Income | Household Savings | Urban | Regional poverty | Owns dacha |
| | (1) | (2) | (3) | (4) | (5) |
| Potato | -1,936.5 | -148.0 | -0.217** | -0.039 | 0.434*** |
| | (1547.1) | (189.2) | (0.083) | (0.0283) | (0.123) |
| Potato × Suitability index | 51.26* | 2.739 | 0.002 | -0.001 | 0.001 |
| | (27.30) | (3.230) | (0.001) | (0.000) | (0.002) |
| Household FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ obs | 16,255 | 16,335 | 21,902 | 21,902 | 16,123 |
| | Panel B | | | | |
| | Uses land | # family members | # kids <7 years | # working age males | # post work age males |
| | (1) | (2) | (3) | (4) | (5) |
| Potato | 0.904*** | 0.481*** | -0.022 | 0.171*** | 0.057 |
| | (0.046) | (0.118) | (0.051) | (0.054) | (0.036) |
| Potato × Suitability index | -0.001 | 0.001 | 0.000 | -0.000 | 0.000 |
| | (0.001) | (0.002) | (0.001) | (0.001) | (0.001) |
| Household FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ obs | 21,902 | 21,902 | 21,902 | 21,902 | 21,902 |

*Note*: This table reports estimates from household-level regressions that relate a range of socioeconomic and demographic characteristics to potato cultivation and its interaction with soil suitability. The coefficient on *Potato* captures average differences between households that did and did not grow potatoes, while the interaction with the *Suitability Index* tests whether these differences vary systematically across more versus less suitable lands. *Regional poverty* is an indicator equal to one if the household's income falls below the regional poverty threshold. Panel A focuses on economic and locational characteristics, including household income, savings, urban residence, regional poverty status, and ownership of a dacha (summer house). Panel B reports demographic composition and land use characteristics, including household size, number of young children, working-age and post-working-age males, and land use. All specifications include household fixed effects and year fixed effects. The data is sourced from the RLMS and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

**Table X.** Adult height by exposure to the transition: Replication of Adserà et al. (2021)

| Dependent variable: | Self-reported adult height (cm) | | | | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| ET | -1.086*** | | | -0.244 | | |
| | (0.375) | | | (0.522) | | |
| ET1 | | -1.434*** | | | -0.664* | |
| | | (0.241) | | | (0.338) | |
| ET2 | | | -1.119*** | | | -0.618** |
| | | | (0.203) | | | (0.279) |
| Mother's height | | | | 0.395*** | 0.395*** | 0.395*** |
| | | | | (0.018) | (0.018) | (0.018) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PSU FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Linear time trend | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ obs | 37,016 | 37,016 | 37,016 | 7,200 | 7,200 | 7,200 |
| $R^2$ | 0.507 | 0.507 | 0.507 | 0.538 | 0.538 | 0.538 |

*Note*: This table replicates the main findings of Adserà et al. (2021) using the Russian Longitudinal Monitoring Survey (RLMS). The dependent variable in all specifications is self-reported adult height. *ET* indicates individuals born during the transition year; *ET1* identifies individuals born or one year old during the transition year; and *ET2* identifies individuals born, one year old, or two years old during the transition year. Columns (4)–(6) additionally control for maternal height. All specifications include controls for gender, age, settlement type (urban/rural), household size, and total real household income, as well as PSU fixed effects and a linear time trend. The data is sourced from the RLMS and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

**Table XI.** Food purchases and expenditures and potato cultivation

| | Panel A: Dependent variable = Indicator of buying: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Potato | Flour | Bread | Nuts | Meat | Dairy | Eggs | Fish | # of goods |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Potato | -0.224*** | -0.054 | 0.009 | -0.027 | 0.007 | 0.004 | -0.035 | -0.016 | -0.275 |
| | (0.044) | (0.057) | (0.020) | (0.057) | (0.065) | (0.058) | (0.065) | (0.061) | (0.785) |
| Potato × Suitability index | 0.001 | 0.001 | -0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.001 | 0.010 |
| | (0.001) | (0.001) | (0.000) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.014) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Household FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PSU FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ obs | 17,400 | 17,373 | 17,398 | 17,391 | 17,392 | 17,398 | 17,387 | 17,388 | 17,407 |

| | Panel B: Dependent variable = Total real expenditures on: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Potato | Bread | Meat | Dairy | Eggs | Fish | Vegetables | Fat | Other |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Potato | -365.7 | 51.6 | -71.9 | 18.9 | 1.7 | -19.5 | 47.5 | -9.0 | -20.4 |
| | (226.1) | (57.9) | (151.9) | (67.9) | (21.3) | (29.7) | (47.4) | (48.6) | (52.9) |
| Potato × Suitability index | 4.1 | 0.1 | 2.6 | -0.2 | -0.02 | 0.7 | -1.3 | 0.8 | 0.5 |
| | (3.6) | (0.9) | (2.7) | (1.1) | (0.6) | (0.6) | (0.9) | (0.9) | (0.9) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Household FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PSU FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ obs | 17,411 | 17,411 | 17,411 | 17,411 | 17,411 | 17,411 | 17,411 | 17,411 | 17,411 |

*Note*: This table reports estimates from household-level regressions that relate food purchasing behavior and food expenditures to potato cultivation and its interaction with local agroecological suitability. Panel A reports results where the dependent variables are indicators for purchasing specific food items during the survey period, as well as the total number of distinct food items purchased. Panel B reports results where the dependent variables are total real household expenditures on the corresponding food categories. All specifications include household fixed effects, year fixed effects, and PSU fixed effects. Control variables include household size, total real household income, and the number of children younger than seven. The data is sourced from the RLMS and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.

**Table XII.** Food possession and quantities and potato cultivation

| | Panel A: Dependent variable = Indicator of possessing: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Potato | Flour | Vegetables | Meat | Fish | Eggs | Oil | Grain | # of goods |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Potato | -0.006 | -0.020 | 0.131 | -0.002 | -0.194** | 0.005 | 0.063 | 0.042 | 0.431 |
| | (0.042) | (0.051) | (0.107) | (0.094) | (0.074) | (0.104) | (0.057) | (0.043) | (0.362) |
| Potato × Suitability index | 0.001 | 0.001 | -0.002 | -0.000 | 0.004** | 0.000 | -0.000 | -0.001 | -0.002 |
| | (0.001) | (0.001) | (0.002) | (0.002) | (0.002) | (0.002) | (0.001) | (0.001) | (0.006) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| household FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PSU FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ obs | 6,424 | 6,424 | 6,424 | 6,424 | 6,424 | 6,424 | 6,424 | 6,424 | 6,424 |

| | Panel B: Dependent variable = Amount of: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Potato | Flour | Pasta | Vegetables | Meat | Fish | Eggs | Oil | Grain |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Potato | 148.9** | -3.1 | -0.4 | 29.3 | -1.4 | 0.6 | -8.3 | 0.01 | -0.5 |
| | (56.2) | (4.1) | (0.6) | (20.7) | (1.3) | (0.6) | (5.8) | (1.0) | (0.9) |
| Potato × Suitability index | -0.366 | 0.050 | 0.005 | 0.085 | 0.033 | -0.006 | 0.124 | -0.004 | 0.010 |
| | (1.089) | (0.068) | (0.011) | (0.378) | (0.033) | (0.012) | (0.105) | (0.016) | (0.016) |
| Controls | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Household FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Year FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| PSU FE | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| $N$ obs | 5,602 | 5,114 | 4,626 | 4,286 | 2,558 | 590 | 3,862 | 3,348 | 5,438 |

*Note*: This table reports estimates from household-level regressions that examine whether potato cultivation is associated with households' possession of food items and the quantities held. Panel A reports results where the dependent variables are indicators for whether a household reports having specific food products, as well as the total number of distinct food items possessed. Panel B reports results where the dependent variables are the quantities of specific food items held by the household. All specifications include household fixed effects, year fixed effects, and PSU fixed effects. Control variables include household size, total real household income, and the number of children younger than seven. The data is sourced from the RLMS and the Food and Agriculture Organization (FAO)'s Global AgroEcological Zones (GAEZ v4, the soil suitability index for potato cultivation).

***, **, * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are clustered at the PSU level and reported in parentheses.