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Mechanisms and Boundary Conditions Through Which Digital Financial Inclusion Affects the Urban–Rural Income Gap

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Abstract. Digital financial inclusion can reduce the cost of financial services in rural areas, but wider coverage does not necessarily narrow the urban–rural income gap. This thematic review examines evidence on credit access, entrepreneurship, industrial and employment change, vulnerability to poverty, and the digital divide. The studies suggest that digital financial inclusion can narrow the average gap by improving access to productive finance and income opportunities, while gains may be distributed unevenly within rural communities. Education, the ability to use digital services, local industrial conditions, and debt risk shape whether improved access translates into higher income. To reconcile these findings, the review organizes the evidence around three stages: access to services, effective use, and conversion into income. It distinguishes disparities between urban and rural residents from inequality within each group, and current income outcomes from the risk of future poverty. This framework identifies questions for household research and suggests that rural financial policy should pair wider access with digital skills, viable local production and employment, and safeguards against excessive debt.

Keywords: digital financial inclusion, urban–rural income gap, income generation, digital divide

1. Introduction

As mobile payments, online credit, and data-driven technologies are expanded into rural financial markets. Residents who were previously constrained by distance from bank branches, high transaction costs, and collateral requirements have gained new ways to make payments and access financing. Whether these services raise income, however, depends on whether residents actually use them and whether local production and employment opportunities are available. The urban–rural income gap therefore cannot be explained by the growth in digital financial inclusion accounts or transaction volumes alone. This paper asks under what conditions digital financial inclusion can raise rural incomes and why its effects vary across places and households.

Studies link digital financial inclusion to a narrower urban–rural gap, citing entrepreneurship and rural credit as possible pathways [1-3]. Yet regional averages can conceal inequality within both urban and rural populations. Household evidence finds that the average gap may narrow while

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inequality within urban and rural areas widens [4]. Work on the broader digital economy also identifies a digital divide and nonlinear effects [5]. This review examines these differences through access, effective use, and conversion into income, asking who uses digital financial services, how the use of these services generates income, and who gains most.

This review aims to examine the average urban–rural gap, inequality among rural households, and vulnerability to future poverty within a common framework. Rather than treating every finding of a "narrower gap" as equivalent, the review compares outcomes across different measures and levels of analysis. This synthesis may help identify more precise questions for household-level research and distinguish the policy support needed for network access, the ability to use financial services, and productive opportunities. The discussion proceeds from income-generating pathways to conditions that shape their effects and, finally, to the limits of the available evidence.

2. Pathways through which digital financial inclusion affects income

2.1. Credit access and household entrepreneurship

Digital technologies can lower transaction and information-verification costs, making payment and credit services more accessible to residents of remote areas and to those without conventional collateral. Using provincial panel data, Gao and colleagues examine the mediating role of rural credit availability, but also find that greater credit availability does not simply strengthen the gap-narrowing effect of digital financial inclusion [3]. Whether a loan generates net income depends on project selection, the use of funds, and the borrower's repayment capacity. Ji and colleagues identify residents' entrepreneurship as one pathway linking digital financial inclusion to convergence between urban and rural incomes [2].

At the household level, Hu and colleagues connect digital financial inclusion, entrepreneurship, and the household income gap, reporting a nonlinear relationship [6]. Taken together, these studies show why the income effect of credit cannot be inferred from loan volumes alone. Productive financing may diversify rural household income when it supports viable businesses. However, where local demand is weak or borrowing costs are high, additional debt may not generate stable income gains.

2.2. Industrial change and labor income

The payment and financing opportunities offered by digital financial inclusion may complement agricultural marketing, farm services, and nonfarm employment. Using data from 52 counties in Zhejiang Province, Wen and colleagues find an association between digital financial inclusion and a narrower urban–rural income gap. In their sample, a more rational industrial structure and changes within agriculture explain more of the observed narrowing than a simple shift toward a larger service sector [7]. Zhao and Li, using provincial data, identify employment structure as a possible channel, while finding that the strength of the effect varies with the level of market development [8].

Industrial activity and employment provide the context in which easier payments and greater access to finance may translate into labor income. Such income gains are not automatic consequences of digital financial inclusion. Where rural areas lack logistics, processing capacity, sales networks, and suitable jobs, wider financial coverage may still have a limited effect on income.

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2.3. Income diversification and vulnerability to poverty

A household's ability to withstand future shocks matters alongside its current income. Yang and colleagues find lower vulnerability to poverty among farmers in areas with more developed digital financial inclusion and identify diversified income sources as a possible economic channel [9]. Drawing on a household finance survey, Liu and Guo associate digital financial inclusion with lower vulnerability to relative poverty and find that the effect varies with education, access to digital tools, and region [10]. These studies broaden the discussion beyond current income. However, a lower risk of poverty does not directly demonstrate that the average urban–rural income gap has narrowed; the two outcomes should be analyzed separately.

3. Conditions and debates

3.1. Digital skills and depth of service use

Account coverage is only the starting point of financial participation. Ji and colleagues find a statistically significant gap-narrowing association for the breadth-of-coverage dimension, whereas the associations for depth of use and degree of digitalization are not statistically significant [2]. In contrast, Wen and colleagues report associations for coverage, depth of use, and digitalization in their Zhejiang County sample [7]. The analyses differ in geographic scope and level of analysis, so their findings need not conflict. These findings suggest that dimensions of a digital financial inclusion index should not be treated as a single mechanism.

Hao and Zhang examine household use of digital financial services and income inequality, emphasizing differences by type of use, education, occupation, and other characteristics [11]. Liu and colleagues further find that middle- and higher-income households, especially those with more education, may receive larger gains [4]. Taken together, these findings suggest that financial education should go beyond account opening by helping users understand product costs, compare products and uses, and recognize risks. This is the review's interpretation of the literature, not an effect independently estimated here.

3.2. Regional infrastructure and industrial conditions

The same financial service may create different income opportunities in different places. Wen and colleagues find a stronger gap-narrowing association in relatively less developed counties in their Zhejiang sample, although the pathways of industrial change differ among counties [7]. In their national provincial sample, Zhao and Li instead report a stronger effect in areas with a higher level of market development [8]. These apparently different patterns reflect differences in samples, stages of development, and local industries. Neither finding implies that less developed regions uniformly benefit more—or less—from digital financial inclusion.

Peng and Dan study the broader digital economy rather than digital financial inclusion alone. Their findings on the digital divide and nonlinear relationships provide context for considering rural connectivity, access to devices, and the capacity of local industries to make use of new services [5]. This review therefore treats infrastructure as a condition for access and the industrial environment as a condition for turning use into income. Future research should measure these conditions separately.

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3.3. Within-group inequality and credit risk

A decline in the average urban–rural income ratio does not guarantee a comparable improvement for low-income rural households. Using household data, Liu and colleagues find that digital financial inclusion narrows the income gap between urban and rural residents while potentially widening income inequality within each population [4]. Researchers therefore need to examine low-, middle-, and high-income groups in rural areas, rather than reporting only an urban–rural average.

The expansion of financial services may also increase debt risk. Yue and colleagues find that digital financial inclusion increases household participation in credit markets and consumption, but also raises the risk of debt distress [12]. Gao and colleagues' estimates for the credit channel likewise do not support the simple claim that more lending always produces a stronger narrowing of the income gap [3]. Policy evaluations should therefore consider loan purposes, repayment pressure, and risk protection rather than assuming that financial participation improves welfare in itself.

4. Assessment of the literature and future research

4.1. Differences in measures and levels of evidence

Existing studies identify possible pathways at several levels, but they do not all measure the same outcome. Urban–rural income ratios and Theil indices at the city or provincial level describe average differences across areas [1, 3]. County-level work reveals finer differences in industrial conditions, while household surveys reveal within-group inequality and vulnerability to future poverty [4, 7, 9]. Describing all of these findings as evidence of a narrower "urban–rural income gap" conflates three distinct outcomes: spatial income differences, household-level inequality, and changes in poverty risk over time.

The studies also use different measures of digital financial inclusion. A regional index describes the service environment, account coverage indicates the possibility of access, and actual household use more directly measures behavior. Inferring a household-level mechanism solely from an association between a regional index and income risks conflating these levels of analysis. Cross-sectional surveys and panel estimate also differ in their ability to establish the order in which changes occurred. As a literature review, this paper provides neither a new causal estimate nor a pooled effect size.

4.2. Testable questions for future research

Future work could link county-level digital financial inclusion conditions with longitudinal household data. It could measure device and network access, account opening, actual use of payment and credit services, and whether borrowed funds enter productive activities. Outcomes should include the urban–rural income gap as well as rural households' wage, business, and transfer income, with changes reported separately for rural income groups.

Such data would allow researchers to test whether education and digital skills influence the transition from access to actual use. Researchers could also test whether industrial and employment conditions influence the transition from use to income. Household debt and vulnerability to poverty should be examined at the same time. This design could identify more clearly who receives the gains from digital financial inclusion and where public services or financial products need adjustment.

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5. Conclusion

The reviewed evidence generally supports the potential for digital financial inclusion to narrow the average urban–rural income gap. Possible pathways include improved access to financial services and productive credit, entrepreneurship and industrial change, and more diverse sources of income. Evidence for these pathways comes from studies using provincial, city, county, and household data and should not be interpreted as estimates of a single causal effect.

Crucially, convergence between urban and rural residents can coexist with growing inequality within each group. Rural digital financial inclusion policy should therefore improve infrastructure and users' ability to access services. It should align credit provision with viable local production and employment opportunities and monitor debt burdens. For research, distinguishing access, effective use, and conversion into income may help determine which households actually experience gains in income and resilience.

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