Mobile Internet, Structural Change, and Female Employment Transition: Evidence from Viet Nam

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Abstract

Mobile internet has emerged as a key general-purpose technology shaping development trajectories in low- and middle-income countries. In Viet Nam, its rapid diffusion has coincided with profound changes in labor market structure, offering a valuable setting to examine how digital connectivity interacts with structural transformation. This study investigates whether and how mobile internet expansion has reshaped employment patterns, with particular attention to gender-differentiated effects. We show that mobile internet diffusion has accelerated labor reallocation away from agriculture toward manufacturing and services, especially among women, and has facilitated transitions from self-employment in agriculture to wage employment. Importantly, these changes reflect not only shifts in employment composition but also improvements in job quality, as indicated by rising wages. The analysis further reveals that these effects operate through gender-specific mechanisms: increases in female educational attainment play a central mediating role, while comparable educational responses are not observed for men.

Keywords: Mobile internet, general purpose technology, female employment transition, structural change, Viet Nam.

JEL Classifications: .

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1 Introduction

Digital platforms and technologies are central to the Fourth Industrial Revolution, driving extensive socioeconomic transformation; however, little is known about their impacts in developing countries (Fu et al., 2021). This paper analyzes mobile internet's diffusion and its impacts on developmental outcomes, focusing on females' employment transition, specifically from traditional sector like agriculture to modern ones including manufacturing and services; as well as from self-employed jobs in agriculture to waged employment and self-employed service jobs.

In the next sections, we present the related literature in Section 2; background and context information in Section 3; then, Section 4 describes the data sources and descriptive analysis, and Section 5 states our empirical strategy. Our research results, including main results and mechanisms analyses, are shown in Section 6; and finally, Section 7 concludes.

2 Background literature

2.1 Mobile internet and employment transition

As a General Purpose Technology (GPT) like other Information and Communication Technologies (ICTs), mobile internet improves productivity and enhances innovation in the ICT sector while also produces multiplier effects in other sectors (Caldarola et al., 2023; Gaglio et al., 2022; Hjort & Poulsen, 2019). Compared to fixed broadband, mobile broadband provides better reach and lower costs of communication and information sharing (Tilson et al., 2010). Mobile internet's ubiquitous connections and mobility characteristics enable the broadening and extension of markets online and offline, transcending geographical boundaries. This improves both the economies of scale (increased demand quantities) and economies of scope (diversity in consumer preferences) (Autor & Dorn, 2013). In developing countries in particular, the benefits can be even larger since emerging countries often do not have legacy technologies or systems in place, so can leapfrog in many areas of service innovation and digitization by implementing cutting-edge infrastructure from the ground up (Barrett et al., 2015).

Mobile broadband enables the introduction of new services and business models i.e., the gig or app economy (Arnold & Taş, 2019; Mandel, 2015), allowing internet-based delivery of products and services (van Welsum, 2016) and promoting a new wave of e-commerce (UNCTAD, 2022). It is also argued that the digitization of information on a massive scale and the digital infrastructures that gather, process, distribute, and use this data – driven by

rapid advancements in internet and mobile technologies over the past decade, including iOS and Android mobile operating systems (OS), social media platforms, and cloud computing services – enable innovative (re)combinations of digital and physical elements to create new products and services (Barrett et al., 2015; Fu et al., 2021; Yoo et al., 2010). Mobile telephony not only improves economic conditions in developing countries but also drives some of the most innovative mobile applications in these regions (Andjelkovic, 2010; Bocij, 2015).

2.2 On female employment transition

Kuhn et al. (2024) note that even without an increase in female labor force participation, structural employment can shift from manufacturing to services if driven by differential technological progress and/or income effects.

Digital infrastructures can "democratize" access to opportunities by providing timely and cost-effective market information, enabling greater work flexibility and reducing mobility constraints. This, in turn, allows women to pursue growth aspirations while balancing work–family commitments (Ughetto et al., 2020; UNCTAD, 2022). Besides the benefits of digital technologies in managing the 'work–family' balance, women may also gain significant improvements in accessing to finance, including mobile payment systems enabling fast and efficient fund transfers, and network resources since women are often excluded from or marginalized within traditional market intelligence networks like business, mentorship, and professional circles (Foss, 2010; Hanson & Blake, 2009). Last but not least, the internet and mobile apps provide lower-cost materials and more interactive resources, including mobile notifications and learning analytics, for learning and training (Bernacki et al., 2020; Steinkuehler & Squire, 2014). The wider socio-economic shifts brought about by ICTs can also reshape social and cultural norms, challenge traditional perceptions of women's roles in society, and enable women to pursue new or different aspirations (Asongu & Nwachukwu, 2016; Rotondi et al., 2020; Suri & Jack, 2016; Viollaz & Winkler, 2022).

Surprisingly, the impact of digital technologies on the evolution of female employment transition remains largely unexplored (McAdam et al., 2020; Ughetto et al., 2020). Most extant literature has been of qualitative nature. Studies by Steel (2017) and T. H. Nguyen (2017), for instance, indicate that mobile internet and smartphones have offered a new form of entrepreneurship where the pursuit of profit is closely entwined with the pull factors of internal motivations for social validation and empowerment. Steel (2017) presents a case of Sudanese women marketing and selling personal care and beauty items via Facebook and other social media – online businesses that are facilitated by urban infrastructure, including 'delivery boys' and digital connectivity, particularly smartphones. These women in Sudan

work from home to run their businesses and widen their social circles, implicating "the broader practices of sociality and diversion from boredom". In Viet Nam, in-depth interviews by T. H. Nguyen (2017) with urban middle-class mothers of young children, who also run online businesses via Facebook, reveal that digital entrepreneurship allows these mothers to engage in online work that not only provides additional income but also expands their social circles, and validates their capabilities to family members. Regarding success factors, H. A. Nguyen et al. (2020)'s qualitative study indicates that Vietnamese female entrepreneurs highly value ongoing learning as a crucial factor for both their personal growth and the development of their businesses.

3 Viet Nam context as a lower-middle income country

Vietnam is recognized for its strong gender equality in terms of formal legal rights, high workforce participation, and advancing health and education outcomes, with some gender equality indicators being ranked higher than world averages (UN Women, 2021). Women's employment rates in the economy, despite being lower than men's, are high, above 80%, and increasing during the period 2010-2016.

Significant gender equality gaps, however, remain, including stereotypes about appropriate fields of study and range of occupations for women, unprotected and low-paid work, and societal expectations that women manage unpaid care duties at home alongside paid work, given inadequate childcare and eldercare infrastructure (UN Women, 2021).

Digital ecosystem, on the other hand, has been evolving rapidly across various sectors including commerce, payment systems, finance, transportation, education, and healthcare (Pham & Phan, 2022). With the widespread use of the internet, smartphones, social media, and the fact that more than half of internet users engaging in online shopping (Hootsuite and We Are Social, 2021),[1] launching a digital business has become increasingly more affordable for female entrepreneurs.

4 Data and descriptive analyses

For our empirical analysis, we incorporate multiple databases from various sources.

[1]With the highest amount of spending being for travel, fashion, and furniture (Hootsuite and We Are Social, 2021).

4.1 Female employment types

Our unit of analysis is provinces as regional economies with variant infrastructure and socio-economic development levels. To calculate the shares of female in waged employment or self-employment, in agricultural, manufacturing, or service sectors for Viet Nam's provinces, we use individual-level data from the Viet Nam Household Living Standard Survey (VHLSS). The VHLSS is conducted biennially by the national General Statistics Office (GSO). Weighted samples in the surveys are designed to be representative of provincial, regional, and national level population (Benjamin et al., 2017; Tarp, 2017). There are 58 provinces and five cities under the management of central government,[2] total 63 provinces hereafter since 2010.

Most Vietnamese women in the labor force engage in agricultural self-employment, followed by waged employment, and lastly, self-employment in the non-agricultural sector. Over the period 2010–2016, there were pronounced provincial disparities in female labor market outcomes and human capital in Viet Nam. Female self-employment in agriculture was most prevalent in Ha Giang province and least prevalent in Ho Chi Minh City (HCMC), the country's largest economic hub. Correspondingly, average female wages were highest in HCMC and lowest in Ha Giang, highlighting a strong spatial gradient in employment quality. In terms of human capital, average years of schooling among women were highest in Ha Noi, the national capital, and lowest in Lai Chau. These patterns underscore substantial regional heterogeneity across labor market structure, earnings, and educational attainment. In term of sectors, Vietnamese females mostly work in agricultural sector, followed by services,[3] and lastly in manufacturing (specific rates are shown in Table 1 below).

4.2 Mobile internet coverage

The mobile internet coverage dataset, sourced from the Global System for Mobile Communications Association (GSMA) in collaboration with Collins Bartholomew, comprises a raster grid of 1 km $\times$ 1 km cells for each year, with each cell indicating whether 2G, 3G, and 4G networks are present in each time period. For the analysis, we will focus on 3G technology, the first fast mobile broadband technology. The mobile internet raster is first overlaid upon a population density raster, obtained from SEDAC (Gao, 2020), following the approach by Mensah (2021). Next, the stacked raster datasets are aggregated to the province level by dividing the sum of the population with access to 3G within each province (i.e., the sum of population living in cells with access to each technology) by the total population of the

[2] Ha Noi, Ho Chi Minh City, Hai Phong, Da Nang, and Can Tho.

[3] VHLSS industry codes for Service sectors are between 35-96. Others include Agriculture 01-03; Mining and Quarrying 05-09; Manufacturing 10-33; Household self-production 97-98; International organizations: 99.

province to create a measure of the share of the population with access to 2G and 3G mobile services. During this period, average provincial 3G coverage has risen greatly from zero in 2010 and below 1% in 2012 to 84% in 2014-2016.

For robustness test, we include the OpenCellID data,[4] the largest publicly available and daily updated (Hodler & Raschky, 2017; Iacoella & Tirivayi, 2021; Viollaz & Winkler, 2022).[5] Numbers of 3G towers whose signals collected (weighted by distances to the province's centroid), transformed by natural logarithm (ln), have increased significantly in the period.

Table 1: Summary statistics

Variable	N	Mean	Std.Dev.	Min	Max
Female agri self-employed rate	252	.513	.202	.00380	.917
Male agri self-employed rate	252	.518	.183	.0162	.912
Female waged employment rate	252	.303	.0905	.104	.571
Male waged employment rate	252	.472	.0866	.185	.691
Female non-agri self-employed rate	252	.201	.0660	.0544088	.457
Male non-agri self-employed rate	252	.156	.0518	.0306	.402
Female employed in agri sector	252	.424	.187	.00577	.869
Male employed in agri sector	252	.408	.188	.017	.839
Female employed in manufacturing	252	.125	.0956	0	.648
Male employed in manufacturing	252	.109	.077	0	.608
Female employed in services	252	.252	.0829	.0530	.514
Male employed in services	252	.329	.106	.0800	.601
Female wages (thousand VND)	252	9356	6498	1806	41183
Male wages (thousand VND)	252	16280	10205	2764	65671
Female mean edu years	252	8.0862	1.591	3.360	11.267
Male mean edu years	252	8.748	1.313	5.2	11.839
3G shares	252	0.405	0.426	0	1
2G shares	252	0.929	0.112	0.330	1

Source: Authors' calculations using VHLSS data.

5 Methodology

Our analysis at the aggregate province level can offer insight into the network and general equilibrium impacts of mobile internet on employment shares across provinces. The main equation used to estimate mobile internet's effect on females' employment shares is:

[4] A collaborative community project run by Unwired Labs – a geolocation service provider www.opencellid.org/downloads.php

[5] The database offers information on cell towers' longitude and latitude[6] and date and time signal collected. Tower geolocations are derived from data gathered by mobile phone users, leading to coverage that is often concentrated along transportation routes and in built-up areas. Additionally, only Android and Blackberry apps collect this data (not iOS), so coverage is more comprehensive in countries where these apps are more widely used, which is especially true in developing nations (FAO, 2021).

$$y_{it} = \beta_0 + \beta_1 Cov_{it} + X_{it} + \epsilon_{it} \quad (1)$$

where y_{it} is provincial female self-employment shares (percentages of the female population that have self-employment) at year t; Cov_{it} is the shares of 3G signal coverage of province i at year t; X_{it} are time-variant control variables, and in our available data, these include percentages of 2G coverage shares per province – controlling for alternative mobile technologies (data also from GSMA), and provincial mean years of schooling (data from VHLSS); and ϵ_{it} denotes is the idiosyncratic error term.

Despite having a number of control variables, Equation 1 above might suffer from a number of endogeneity issues, including omitted variable bias (OVB) owing to variables that are unobservable or unmeasurable, like provincial cultures or traditions; as well as potential multicollinearity among the control variables. To address this issue, we add province fixed effects (FE) which can control for different trends in market outcomes across geographical units (e.g. local tradition or culture on educational aspirations). Furthermore, we also add time FE (e.g., a general rise in tech-savvy culture).

As such, our main empirical analyses will use the following models:

$$y_{it} = \beta_0 + \beta_1 Cov_{it} + X_{it} + f_i + \gamma_t + \epsilon_{it} \quad (2)$$

with f_i for province FE; γ_t for time FE.

6 Empirical results

6.1 Main results

6.1.1 By Employment types

Table 2 reports the estimated effects of mobile internet diffusion on female employment types. The results indicate a statistically significant increase in women's participation in waged employment, but negative effects on agricultural self-employment. There are insignificant associations with females engaging in non-agricultural self-employment.

For males, on the other hand, there are no association between 3G internet diffusion and self-employment rates in agriculture, as can be seen in Table 3 below.

These results indicate a general trend towards formalization of employment types in Viet Nam, from less self-employment in agriculture toward more waged employment, especially

Table 2: Mobile internet and female employment by employment types

	Agri self-employed		Waged		Non-agri self-employed	
	(1)	(2)	(3)	(4)	(5)	(6)
3G shares	-0.0152*	-0.0763**	0.0361***	0.0366	-0.00137	-0.0143
	(0.00886)	(0.0289)	(0.00863)	(0.0253)	(0.00688)	(0.0306)
2G shares	0.0934**		-0.0269		-0.0511	
	(0.0457)		(0.0524)		(0.0729)	
Mean edu years	-0.0381***		0.0130		0.0135	
	(0.0127)		(0.0113)		(0.0128)	
Constant	0.753***	0.545***	0.205**	0.289***	0.135	0.207***
	(0.0982)	(0.0117)	(0.101)	(0.0102)	(0.106)	(0.0124)
Observations	252	252	252	252	252	252
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes
R^2	0.972	0.972	0.893	0.894	0.824	0.826
Adjusted R^2	0.962	0.963	0.855	0.856	0.763	0.764

Notes: Each column reports estimated effects of 3G coverage on provincial employment by employment types of females. Standard errors are clustered at the province level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Mobile internet and Male employment by employment types

	Agri self-employed		Waged		Non-agri self-employed	
	(1)	(2)	(3)	(4)	(5)	(6)
3G shares	-0.00837	-0.0474	0.0283***	0.0203	-0.000973	-0.0169
	(0.00743)	(0.0311)	(0.00627)	(0.0337)	(0.00559)	(0.0220)
2G shares	0.105*		-0.0336		-0.0186	
	(0.0576)		(0.0755)		(0.0274)	
Mean edu years	-0.0249*		-0.00194		0.00343	
	(0.0131)		(0.0153)		(0.00804)	
Constant	0.634***	0.538***	0.509***	0.464***	0.145**	0.163***
	(0.0901)	(0.0126)	(0.127)	(0.0136)	(0.0677)	(0.00891)
Observations	252	252	252	252	252	252
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes
R^2	0.968	0.969	0.852	0.853	0.790	0.796
Adjusted R^2	0.957	0.957	0.800	0.800	0.717	0.724

Notes: Each column reports estimated effects of 3G coverage on provincial employment by employment types of males. Standard errors are clustered at the province level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

for females.

6.1.2 By sectors

Beyond changes in employment types, the period of 3G internet diffusion in Viet Nam is also associated with pronounced structural shifts in female employment across sectors. As reported in Table 4, women experienced a systematic reallocation of labor away from agriculture and toward manufacturing and services. This sectoral transition is consistent with broader processes of structural transformation, whereby labor moves from lower-productivity agricultural activities into higher-productivity non-agricultural sectors. The results suggest that mobile internet expansion results in not only changes in contractual form of employment but also with deeper reorganization of women's sectoral participation within the economy.

Table 4: Mobile internet and female employment by sectors

	Agriculture		Manufacturing		Services	
	(1)	(2)	(3)	(4)	(5)	(6)
3G shares	-0.00379	-0.0899**	-0.00656	0.0774**	0.0229***	0.00486
	(0.0141)	(0.0414)	(0.0144)	(0.0316)	(0.00536)	(0.0199)
2G shares	0.179**		-0.116		-0.0379	
	(0.0855)		(0.0799)		(0.0337)	
Mean edu years	-0.0609***		0.0234*		0.0227**	
	(0.0174)		(0.0125)		(0.0108)	
Constant	0.771***	0.461***	0.0383	0.0938***	0.0871	0.250***
	(0.127)	(0.0168)	(0.0879)	(0.0128)	(0.0829)	(0.00807)
Observations	252	252	252	252	252	252
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes
R^2	0.922	0.919	0.756	0.760	0.895	0.894
Adjusted R^2	0.895	0.890	0.671	0.675	0.858	0.856

Notes: Each column reports estimated effects of 3G coverage on provincial female employment by sector. Standard errors are clustered at the province level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

In contrast to the female labor market responses, the estimates for men reveal no statistically significant effects of 3G internet diffusion on sectoral employment composition. As shown in Table 5, male employment shares across agriculture, manufacturing, and services remain largely unchanged during the period of mobile internet expansion. This absence of significant sectoral reallocation suggests that structural transformation associated with mobile internet diffusion operated primarily through female employment, with limited observable effects on male sectoral mobility.

Table 5: Mobile internet and Male employment by sectors

	Agriculture		Manufacturing		Services	
	(1)	(2)	(3)	(4)	(5)	(6)
3G shares	0.00764	-0.0283	-0.00378	0.0470*	0.00921	-0.0430
	(0.0114)	(0.0394)	(0.0120)	(0.0263)	(0.00769)	(0.0321)
2G shares	0.169*		-0.118*		0.0270	
	(0.0888)		(0.0612)		(0.0554)	
Mean edu years	-0.0481***		0.00829		0.0290***	
	(0.0145)		(0.00921)		(0.0101)	
Constant	0.653***	0.420***	0.151**	0.0906***	0.0566	0.347***
	(0.0988)	(0.0160)	(0.0667)	(0.0107)	(0.0929)	(0.0130)
Observations	252	252	252	252	252	252
Province FE	Yes	Yes	Yes	Yes		
Year FE	No	Yes	No	Yes		
R^2	0.937	0.937	0.720	0.722	0.899	0.903
Adjusted R^2	0.914	0.914	0.622	0.623	0.864	0.869

Notes: Each column reports estimated effects of 3G coverage on provincial male employment by sectors. Standard errors are clustered at the province level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6.1.3 On wages

Table 6 presents the estimated relationship between provincial 3G coverage and individual wages in Viet Nam. The results indicate a positive and statistically significant association between higher 3G coverage shares and wage levels for both women and men. This finding suggests that mobile internet diffusion is correlated with improvements in earnings across genders, consistent with gains in job quality and productivity.

6.2 Mechanisms

As reported in Table 7, the estimated effects of 3G internet diffusion on educational attainment, measured by mean years of schooling, are gender-differentiated. For women, greater mobile internet coverage is associated with a statistically significant increase in years of schooling, whereas for men the association is negative. These contrasting patterns suggest that mobile internet expansion may differentially alter educational incentives and opportunity costs across genders. Related evidence from Rwanda supports the relevance of such mechanisms: Caldarola et al. (2023) show that mobile internet expansion increased employment and reshaped its composition, with changes in education, migration, and labor demand playing central roles. Taken together, these findings highlight education as a key channel through which digital connectivity influences labor market outcomes, while underscoring the importance of gender-specific responses.

Table 6: Mobile internet and Ln wages

	Female				Male	
	(1)	(2)	(3)	(4)	(5)	(6)
3G shares	0.501***	0.0260	0.579***	0.269*	0.461***	-0.0461
	(0.0344)	(0.105)	(0.0533)	(0.159)	(0.0343)	(0.132)
2G shares	1.302***		0.871*		1.357***	
	(0.426)		(0.446)		(0.460)	
Mean edu years	0.343***		0.435***		0.283***	
	(0.0698)		(0.0814)		(0.0729)	
Constant	5.001***	9.286***	4.239***	8.837***	5.687***	9.537***
	(0.631)	(0.0425)	(0.658)	(0.0645)	(0.684)	(0.0533)
Observations	252	252	252	252	252	252
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes
R^2	0.880	0.953	0.851	0.907	0.888	0.951
Adjusted R^2	0.837	0.936	0.799	0.874	0.849	0.933

Notes: Each column reports estimated effects of 3G coverage on provincial wages. Standard errors are clustered at the province level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Mobile internet and Mean years of schooling by gender

	Females		Males	
	(1)	(2)	(3)	(4)
3G shares	0.0729***	-0.0867	-0.0726***	-0.231
	(0.0249)	(0.197)	(0.0249)	(0.249)
2G shares	-0.190		0.147	
	(0.181)		(0.187)	
Mean edu years	1.015***		0.990***	
	(0.0415)		(0.0419)	
Constant	-0.308	8.121***	0.313	8.843***
	(0.362)	(0.0799)	(0.367)	(0.101)
Observations	252	252	252	252
Province FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes
R^2	0.995	0.980	0.993	0.970
Adjusted R^2	0.993	0.974	0.990	0.959

Notes: Each column reports estimated effects of 3G coverage on provincial mean years of schooling. Standard errors are clustered at the province level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

6.3 Robustness checks

For our robustness test, we conduct the same specifications using alternative data for mobile internet coverage. We compute the number of 3G cell towers of which signals are collected per province (each cell is weighted by the inverse of distance to the province's centroid), which is

then divided by provincial population and transformed by natural logarithm. We find results in the same directions, as can be seen in Tables B1, B2, B3, and B4 in the appendix.

7 Conclusions and discussion

The diffusion of mobile internet has catalyzed structural transformation in Viet Nam, particularly by facilitating female labor reallocation from agriculture to manufacturing and services, and from self-employment in agriculture to wage employment. This structural shift affects not only the quantity but also the quality of employment, as evidenced by rising wages. Notably, in Viet Nam, these dynamics are mediated by increased educational attainment among women, whereas comparable educational effects are not observed for men.

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Appendices

Table B1: Robustness test, Mobile internet and Female employment by types

	Agri self-employed		Waged		Non-agri self-employed	
	(1)	(2)	(3)	(4)	(5)	(6)
Ln 3G weighted counts	-0.00672***	-0.0110**	0.00816***	0.00452	-0.000483	-0.00181
	(0.00252)	(0.00448)	(0.00192)	(0.00388)	(0.00202)	(0.00518)
2G shares	0.0864*		0.0156		-0.0521	
	(0.0443)		(0.0505)		(0.0715)	
Mean edu years	-0.0294**		0.0147		0.0139	
	(0.0132)		(0.0106)		(0.0131)	
Constant	0.689***	0.527***	0.155	0.298***	0.133	0.203***
	(0.100)	(0.00549)	(0.0974)	(0.00475)	(0.106)	(0.00634)
Observations	252	252	252	252	252	252
R^2	0.973	0.972	0.886	0.893	0.825	0.826
Adjusted R^2	0.964	0.962	0.846	0.855	0.763	0.764

Notes: Each column reports estimated effects of 3G coverage on employment shares by types. Standard errors are clustered at the province level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table B2: Robustness test, Mobile internet and Female employment by sector

	Agriculture		Manufacturing		Services	
	(1)	(2)	(3)	(4)	(5)	(6)
Ln 3G weighted counts	-0.00334	-0.0145***	0.00127	0.00964**	0.00521***	0.00194
	(0.00318)	(0.00525)	(0.00307)	(0.00400)	(0.00189)	(0.00379)
2G shares	0.183**		-0.132*		-0.0111	
	(0.0852)		(0.0787)		(0.0340)	
Mean edu years	-0.0539***		0.0152		0.0236**	
	(0.0178)		(0.0119)		(0.0105)	
Constant	0.712***	0.442***	0.119	0.113***	0.0571	0.250***
	(0.126)	(0.00643)	(0.0723)	(0.00490)	(0.0811)	(0.00464)
Observations	252	252	252	252	252	252
R^2	0.923	0.919	0.756	0.758	0.892	0.894
Adjusted R^2	0.896	0.890	0.671	0.671	0.854	0.856

Notes: Each column reports estimated effects of 3G coverage on employment shares by sectors. Standard errors are clustered at the province level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table B3: Robustness test, Mobile internet and Wages

	Females				Males	
	(1)	(2)	(3)	(4)	(5)	(6)
Ln 3G weighted counts	0.146***	0.0151	0.157***	0.0556*	0.139***	0.00649
	(0.0130)	(0.0212)	(0.0156)	(0.0323)	(0.0126)	(0.0217)
2G shares	1.781***		1.466***		1.783***	
	(0.417)		(0.445)		(0.446)	
Mean edu years	0.271***		0.389***		0.205***	
	(0.0676)		(0.0830)		(0.0707)	
Constant	5.182***	9.278***	4.122***	8.878***	5.965***	9.510***
	(0.640)	(0.0259)	(0.672)	(0.0396)	(0.682)	(0.0266)
Observations	252	252	252	252	252	252
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes	No	Yes
R^2	0.885	0.953	0.842	0.908	0.896	0.951
Adjusted R^2	0.844	0.936	0.787	0.876	0.860	0.933

Notes: Each column reports estimated effects of 3G coverage on provincial wage levels. Standard errors are clustered at the province level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table B4: Robustness test, Mobile internet and Education

	Female		Male	
	(1)	(2)	(3)	(4)
Ln 3G weighted counts	0.0271***	0.0671*	-0.0268***	0.0199
	(0.00591)	(0.0362)	(0.00609)	(0.0410)
2G shares	-0.139		0.0961	
	(0.173)		(0.180)	
Mean edu years	0.988***		1.016***	
	(0.0448)		(0.0455)	
Constant	-0.133	8.004***	0.142	8.724***
	(0.382)	(0.0444)	(0.389)	(0.0502)
Observations	252	252	252	252
Province FE	Yes	Yes	Yes	Yes
Year FE	No	Yes	No	Yes
R^2	0.995	0.981	0.993	0.970
Adjusted R^2	0.993	0.974	0.990	0.959

Notes: Each column reports estimated effects of 3G coverage on provincial education. Standard errors are clustered at the province level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$