Transforming informal work and livelihoods in Costa Rica and Nicaragua

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Abstract: We divide workers into six work statuses: formal self-employed, upper-tier informal self-employed, lower-tier informal self-employed, formal wage-employed, upper-tier informal wage-employed, and lower-tier informal wage-employed. In both Costa Rica and Nicaragua, earnings are highest for formal work, next for upper-tier informal, and last for lower-tier informal. Mobility out of lower-tier informal work is higher than out of all other work statuses. While many lower-tier informal workers leave employment or transition into other informal statuses, most transitions are from lower-tier informal into upper-tier informal and formal work. Transitions from all types of informality into formality are more common in Costa Rica than in Nicaragua, partly due to the larger proportion of formal workers within Costa Rica (58 per cent vs 19 per cent). Regressions of transitions on worker characteristics suggest that policies of providing vocational training and formal education to informal workers can promote transitions into better-paying work statuses.

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1   Introduction

By a variety of measures, a large proportion of workers in developing economies are in informal work, where compliance with regulations is weak, wages and productivity are low, workers do not receive legally mandated government labour protections, and neither workers nor employers pay legally mandated payroll or income taxes. Informal work is often considered a place of residual employment for marginalized and vulnerable workers. However, it can also be seen as a dynamic sector of budding entrepreneurs: the staging ground for the development of firms that may eventually employ a large number of workers. Any analysis of informality must recognize this heterogeneity, differentiating between workers who are informal because of lack of formal employment opportunities ('lower-tier informal') and those who are self-employed or working in small firms voluntarily because of comparative advantage or preferences ('upper-tier informal').

In this paper we characterize the heterogeneity of informal work in Costa Rica and Nicaragua. Specifically, we divide workers into six work statuses: formal self-employed, upper-tier informal self-employed, lower-tier informal self-employed, formal wage-employed, upper-tier informal wage-employed, and lower-tier wage-employed.

Costa Rica and Nicaragua are neighbouring countries in Central America that present contrasting economic structures. GDP per capita in Costa Rica (US$19,762) is more than three times that in Nicaragua ($5,834) and poverty is half (1.4 per cent vs 3.2 per cent below $1.90/day, and 22 per cent vs 41 per cent at national poverty lines).[1] Public spending on the social sectors is higher in Costa Rica than in Nicaragua: 21 per cent of GDP in Costa Rica ($1,325 per) vs 14 per cent in Nicaragua ($157 per capita; Acosta et al. 2017). Most interestingly for this paper, Costa Rica has one of the most formal labour markets in Latin America while Nicaragua has one of the least formal. We estimate that more than 80 per cent of workers in Nicaragua are informal, while only 41 per cent of workers in Costa Rica are informal. Of these, fewer than 10 per cent of workers in Costa Rica are lower-tier informal while 36 per cent are lower-tier informal in Nicaragua.

We find that in both Costa Rica and Nicaragua, earnings are highest for formal work (both the self-employed and wage employees), next for upper-tier informal followed by lower-tier informal self-employed, and last for lower-tier informal wage-employed. We also find that in both Nicaragua and Costa Rica, mobility out of the worse work statuses—lower-tier informal self-employment and lower-tier informal wage employment—is higher than in all other work statuses. This suggests that workers in Costa Rica and Nicaragua are not stuck in lower-tier informal work and that there is scope for promoting transitions from informal work into better-paying work statuses. Regressions of transitions on worker characteristics suggest that policies of providing vocational training and formal education to informal workers can promote transitions into better-paying work statuses.

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[1] World Bank World Development Indicators, 2018 or most recent year. All dollar amounts are in current purchasing power parity (PPP) dollars.

2 Definitions and identification of the formal, upper-tier informal, and lower-tier informal work statuses

In this section we describe the data and methodology used to identify which workers belong to which of the six different work statuses.

2.1 Data

Costa Rica

The data used in this analysis consist of a panel data set of individuals constructed from the 2011–18 annual Costa Rican National Household Surveys (Encuesta Nacional de Hogares, or ENAHO, in Spanish). These household surveys are cross-sectional surveys that are conducted annually by the Costa Rican National Statistics and Census Institute. The ENAHO uses a rotating sample design whereby interviewers in one year return to approximately 75 per cent of the households interviewed in the previous year. Interviewers record a code identifying the address of each dwelling surveyed, which allows them to track dwellings that are surveyed in consecutive surveys. The Institute next checks that the same dwellings include the same households by comparing the personal characteristics of each household member (i.e. age, gender, education levels, etc.) for each consecutive year. Finally, using information on the personal characteristics of each member of each household, the Institute is able to match individuals across consecutive years. Using this strategy, the Institute has constructed seven year-to-year panel data sets of households and individuals (2011–12, 2012–13, 2013–14, 2014–15, 2015–16, 2016–17, and 2017–18). Each year 25 per cent of households are replaced in the sample; this implies that we will be able to follow, at most, 75 per cent of households from year to year, although in practice our sample is smaller. The year-to-year panels that we use include 37 per cent of all individuals between the ages of 15 and 65 who were interviewed in the ENAHO from 2011 to 2018.

Nicaragua

The primary data source used in this paper for Nicaragua is a panel data set collected by the Fundación Internacional para el Desafío Económico Global (FIDEG), which follows households and household members from 2009 to 2017. The FIDEG survey is designed to measure poverty annually using household aggregate consumption as a welfare indicator, and also includes data on household and individual characteristics, wages and other employment characteristics, access to some public services, and physical housing structure. It is a shorter version of the Living Standards Measurement Survey and the sample is a nationally representative panel of 1,700 households located in urban and rural areas throughout the country. The sample was designed using as the sampling frame the cartography of the Population and Dwellings Census conducted in 2005 by the National Institute of Statistics (INEC) and it is representative at national, urban, and rural levels; it is probabilistic and stratified. The primary sampling units are '*segmentos censales*' and the second-stage units are households within each segment. Eight households were selected in each segment using systematic sampling with random start.

In both Costa Rica and Nicaragua, we limit our samples to the working-age population, i.e. those aged 15 to 65.

2.2 Identification of formal, upper-tier informal, and lower-tier informal work among wage employees and the self-employed

Following the International Labour Organization (ILO) Thesaurus, our framework for identifying formal, upper-tier informal, and lower-tier informal workers is based on whether or not regulations and mandatory labour protections are complied with. Employers and workers who comply with all registration requirements and labour protections are identified as formal; those who comply with some but not all regulations and worker protections are upper-tier informal, and those who do not comply with any registration requirements or labour protections are lower-tier informal. In addition, we distinguish between wage employees and the self-employed.

The identification of workers into each work status in Costa Rica and Nicaragua is summarized in Table 1.

Table 1: Work status definition and operationalization, Costa Rica and Nicaragua

Work status group	Costa Rica	Nicaragua
Formal self-employed	We identify formal self-employed workers as the self-employed (own-account or owners) who follow all regulations—specifically, those who both contribute to Social Security and are registered. Workers are identified as registered if they are registered in the National Records or other public institution or keep formal accounts for reporting to the government.	Formal self-employed workers are those who are affiliated with Social Security in any capacity.
Upper-tier informal self-employed	Upper-tier informal self-employed workers are identified as those who comply with some but not all regulations—specifically, the self-employed (own-account and owners) who are registered or receive some type of Social Security health insurance (including the special regime, as a direct dependent of an insured employee, insured by the government or with private insurance), but are not both registered and receiving Social Security. Even if they are neither registered nor receiving Social Security, other self-employed workers are classified as upper-tier informal self-employed if they are in a profession that requires post-secondary or vocational education, if they are employers with at least one employee, or if their place of work has a fixed premises.	Upper-tier informal self-employed are defined as those who work in a unit with at least one wage employee or who have private or other self-paid health insurance.
Lower-tier informal self-employed	Self-employed workers who have no type of health insurance and are not registered, have no paid employees, and are not professional or technical workers. This includes those whose place of work has no fixed premises (i.e. they work in the owner's dwelling, are itinerant, or work on construction sites or agricultural plots).	Lower-tier informal self-employed are all other self-employed workers who have no health insurance (either Social Security or self-paid).
Formal wage employees	Wage employees whose employers contribute to Social Security or who are public sector employees.	Wage employees whose employers contribute to Social Security for the worker or who are public sector employees.
Upper-tier informal wage employees	Wage employees whose employers do not contribute to Social Security but who have Social Security health insurance as a dependant of someone who is directly insured, who pay through the 'special regime' or '*cuota voluntaria*', who are insured by the state or private insurance; or who receive other mandated benefits such as paid annual leave, paid sick leave, work risk insurance, or *aguinaldo*	Upper-tier informal employees are all employees who are neither formal nor lower-tier informal.

	(mandated one-month salary bonus in December); or from whose salary income taxes are deducted; or who are professional or technical employees.	
Lower-tier informal wage employees	Lower-tier informal employees are all other employees—that is, lower-tier informal employees have no health insurance and receive no other labour protection benefits.	Lower-tier informal wage employees are identified as domestic servants and others working in a private household.

Source: authors' construction based on ILO (2019).

Costa Rica

In the ENAHO household surveys, wage employees are self-identified as 'wage employees, unpaid assistants or private household workers' (including domestic servants). For private household wage employees, the household (family) for whom they work is considered the employer. Wage employees also include unpaid employees in family enterprises. We discuss first how we identify formal and the two types of informal wage employees and then how we disaggregate formal and the two types of informal self-employed.

In the literature, informality may be defined relative to the employer or the worker. In this paper we focus on workers and follow the ILO Thesaurus definition of informal work as comprising 'all remunerative work (i.e. both self-employment and wage employment) that is not registered, regulated or protected by existing legal or regulatory framework, as well as non-remunerative work undertaken in an income-producing enterprise' (ILO 2019). The common operationalization of 'not protected by the existing legal or regulatory framework' is whether or not the employer contributes to Social Security (through payroll taxes) for the employee. We follow this convention and identify formal wage employees as those whose employers contribute to Social Security for the worker.[2] This operationalization makes sense in Costa Rica as Social Security (which provides both health care and pensions) is the most widespread and desired social protection and payment of Social Security contributions is the most strongly enforced tax.

We identify as upper-tier informal wage employees those whose employers comply with some regulations and mandated worker protections but not all. In Costa Rica, workers whose employers do not pay Social Security payroll taxes may still be covered by other labour protections. Other labour protections in Costa Rica include: sick leave, paid vacations, an *aguinaldo* (a mandated one-month salary bonus in December), overtime pay, worker compensation insurance, safety regulations, and maternal benefits. Our data include information on whether employees receive any of these other benefits. We identify as upper-tier informal employees those whose employers do not contribute to Social Security but who receive paid sick leave, paid vacations, work risk insurance, or the *aguinaldo*. We also include as upper-tier informal wage employees those whose employers do not contribute to Social Security but who do have salary deductions for income taxes. Professional and technical wage employees are also identified as upper-tier informal employees. We also identify wage employees as upper-tier informal if they are covered by Social Security but their employers do not pay their payroll taxes—for example, if the employee is a direct dependant of someone whose employer does pay Social Security payroll taxes. A few people also pay directly for private insurance, which covers private clinics and hospitals but not Social Security clinics and hospitals. It is likely that all of these employees voluntarily forgo employer-subsidized

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[2] Public sector workers are also automatically included as formal sector employees. Most public sector workers are affiliated with the Social Security system. However, some, such as teachers, are affiliated with an alternative pension system, but have to contribute to the health insurance of the Social Security system and other mandatory payroll taxes.

Social Security in exchange for other forms of compensation such as higher wages. These workers are informal but are likely to be voluntarily so.

Lower-tier informal wage employees are identified as those who are neither formal nor upper-tier informal wage employees. That is, lower-tier informal wage employees are those who receive no Social Security insurance or other labour protection benefits. These individuals could be employees in a firm, work in a private household, or work as an unpaid family member, or they could be workers whose wage is paid in kind or in a single payment or per piece.

Self-employed workers are those who self-identify as own-account workers or owners of firms (employers). Self-employed workers in Costa Rica are legally required to be registered with both Costa Rica Social Security (CCSS) and the Ministry of Finance. Social Security is mandated for all workers, including wage employees and the self-employed. Self-employed workers pay under a 'special regime', which is the means by which they can contribute, and be affiliated, to the Social Security system in Costa Rica. This is needed because the 'normal' way that workers contribute to Social Security is through their employer, which self-employed workers do not have. The self-employed must pay both the employer and employee contributions to Social Security.[3] Moreover, every private contractor is required to verify that a self-employed worker offering goods or services to their business is registered to both public institutions before contracting for any of their services. Each entity, the CCSS and the Ministry of Finance (known as the Hacienda in Costa Rica), is in charge of enforcing its own law and taxes, so it is possible for a self-employed worker to be registered with the CCSS but not with the Ministry of Finance (or vice versa).

For self-employed workers to fully comply with the law in Costa Rica, they must both pay into Social Security and be registered. We identify formal self-employed workers as those who follow all regulations: specifically, those who both contribute to Social Security *and* are registered. Workers are identified as registered if they are registered with the National Records or other public institution[4] or keep formal accounts for reporting to the government.

Upper-tier informal self-employed are identified as those who comply with some but not all regulations—specifically, if they are registered or receive some type of Social Security health insurance (including through the special regime, as a direct dependant of an insured employee, insured by the government, or through private insurance) but are not registered and do not have Social Security. Even if they are neither registered nor paying Social Security, other self-employed workers are classified as upper-tier informal self-employed if they are in a profession that requires post-secondary education, if they are employers with at least one employee, or if their place of work has a fixed premises.

Lower-tier informal self-employed are identified as those who do not comply with any mandated government regulations—specifically, if they have no type of health insurance and are not

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[3] However, low-wage self-employed workers are subsidized by the government and therefore pay lower Social Security taxes. For example, workers earning less than 78.85 per cent of the minimum wage pay 6.43 per cent of their income into the Social Security system under the special regime, workers earning between 78.85 per cent of and twice the minimum wage pay 9.3 per cent, workers earning between twice and four times the minimum wage pay 12.28 per cent, etc. The maximum Social Security tax for those in the special regime is 17.62 per cent of earnings (up to September 2017). This graduated payment scale by income is designed to encourage all self-employed workers, including the poor, to become enrolled into the Social Security system.

[4] Although the ENAHO does not inquire directly about being registered with the Ministry of Finance, it does inquire about registration with National Records—which is more common for larger firms or employers—and any other public entity, which would include the Ministry of Finance. Also, those keeping formal accounting books are likely to have them for tax purposes.

registered, have no paid employees, and are not professional or technical workers. This includes those whose place of work has no fixed premises (i.e. they work in the owner's dwelling, are itinerant, or work on construction sites or agricultural plots).

Nicaragua

In the FIDEG survey, wage employees are those who self-identify as an employee or a labourer (including domestic servants). Wage employees also include unpaid employees in family enterprises.

As in Costa Rica, we follow the convention of identifying formal wage employees as those whose employers contribute to Social Security for the worker. Other wage employees are informal. We identify lower-tier informal wage employees as domestic servants and others working in private households. Upper-tier informal employees are all other employees whose employers do not contribute to Social Security.

Self-employed workers are those who self-identify as own-account workers or owners of firms (employers). Self-employed workers are not legally required to contribute to Social Security, but they can personally and voluntarily pay Social Security contributions through the '*seguro facultativo*'; However, we estimate that very few—approximately 2 per cent of self-employed workers—do so. Workers who do not contribute to Social Security still have access to local public health clinics.

Formal self-employed workers are those who are affiliated with Social Security in any capacity. Upper-tier informal self-employed are defined as those who work in a unit with at least one wage employee or who have private or other self-paid health insurance. Lower-tier informal self-employed are all other self-employed workers who have no health insurance (either Social Security or self-paid).

3   Descriptive analysis

In this section we look at the characteristics of workers in each work status, including wages, poverty, hours worked, education, age, and gender.

3.1   Distribution by work status

Table 2 presents the distribution of workers (and those not in the labour force) in each work status for Costa Rica and Nicaragua. Overall, compared with Costa Rica, work in Nicaragua is less formal, with a much larger proportion of lower-tier informal workers. Formal work includes almost 60 per cent of workers in Costa Rica compared with 19 per cent in Nicaragua. While in both Costa Rica and Nicaragua upper-tier informal work is accounts for a larger number of workers than lower-tier informal work, the overall proportion of lower-tier informality is very different; in Nicaragua lower-tier informal work accounts for 36 per cent of workers while in Costa Rica it accounts for only 9 per cent; this represents 43 per cent of informal workers in Nicaragua and 22 per cent in Costa Rica. In both countries, the proportion of workers who are wage employees is higher than the proportion of self-employed workers, although the latter is larger in Nicaragua—38 per cent compared with 22 per cent in Costa Rica. The proportion of formal self-employment is particularly small in Nicaragua, at less than 1 per cent of workers, compared with over 5 per cent of workers in Costa Rica.

Table 2: Percentage in each work and employment status for Costa Rica and Nicaragua

Costa Rica			Working-age population	Labour force	All workers	Informal workers	Self-employed	Wage employment
Self-employed	Formal		3.1%	5%	5%		24.2%	
	Informal	Upper-tier	7.9%	13%	14%	33%	61.7%	
		Lower-tier	1.8%	3%	3%	8%	14.1%	
Wage employees	Formal		30.4%	49%	53%			68%
	Informal	Upper-tier	10.6%	17%	18%	44%		24%
		Lower-tier	3.6%	6%	6%	15%		8%
Not employed	Unemployed		5.0%	8%				
	Full-time students		13.4%					
	Out of the labour force		24.1%					
Nicaragua			Working-age population	Labour force	All workers	Informal workers	Self-employed	Wage employment
Self-employed	Formal		0.5%	1%	1%		1.8%	
	Informal	Upper-tier	14.1%	20%	20%	25%	54.0%	
		Lower-tier	11.6%	16%	17%	20%	44.2%	
Wage employees	Formal		12.1%	17%	18%			28%
	Informal	Upper-tier	17.8%	25%	26%	32%		42%
		Lower-tier	12.9%	18%	19%	23%		30%
Not employed	Unemployed		2.2%	3%				
	Full-time students		6.6%					
	Out of the labour force		22.2%					

Source: authors' calculations based on the data described in Section 2.1; for Costa Rica, average of ENAHO 2016, 2017, and 2018; for Nicaragua, average of FIDEG panel, 2009–17.

3.2 Hourly wages, hours worked, monthly earnings, household income, and poverty

Table 3 presents mean hourly wages, hours worked per week, monthly earnings, and poverty rates by work status, in local currencies (2017 córdobas in Nicaragua and 2015 colones in Costa Rica). In both countries, for each type of formality and informality the estimated hourly wages of the self-employed are higher than the wages of employees. This may be because reported wages for the self-employed include returns to capital and entrepreneurship as well as returns to labour. Among wage employees, wages for formal employees are the highest, followed by upper-tier informal employees, and finally lower-tier informal employees. Among the self-employed, wages for the formal self-employed are the highest, followed by upper-tier informal self-employed, and finally lower-tier informal self-employed. The mean hours worked of wage employees in both Costa Rica and Nicaragua are highest for formal, followed by upper-tier informal, and lowest for lower-tier informal. This accentuates monthly earnings differences between work statuses among wage employees. For the self-employed in Costa Rica, mean hours worked and mean monthly earnings are highest for formal, next for upper-tier informal, and lowest for lower-tier informal. For the self-employed in Nicaragua, mean hours worked and mean monthly earnings are highest for upper-tier informal. However, because the sample size of the formal self-employed in Nicaragua is very small, we have less confidence in earnings comparisons for this work status than for other work statuses.

Table 3: Hourly wage, weekly hours worked, monthly earnings, and poverty rates by work status, Costa Rica and Nicaragua

Costa Rica			Hourly wage	Weekly hours worked	Monthly earnings	Poverty rate
Self-employed	Formal		3,684	53	617,913	11.5%
	Informal	Upper-tier	2,387	36	280,491	23.0%
		Lower-tier	1,977	40	202,642	33.7%
Wage employees	Formal		2,939	48	521,279	6.7%
	Informal	Upper-tier	1,802	33	193,130	22.2%
		Lower-tier	1,251	31	143,748	35.7%
Nicaragua			Hourly wage	Weekly hours worked	Monthly earnings	Poverty rate
Self-employed	Formal		54	35	6,036	4.8%
	Informal	Upper-tier	39	41	6,114	39.0%
		Lower-tier	32	32	3,512	36.0%
Wage employees	Formal		38	49	7,211	23.6%
	Informal	Upper-tier	23	46	3,982	48.0%
		Lower-tier	16	34	2,576	44.5%

Source: authors' calculations based on the data described in Section 2.1; for Costa Rica, average of 2011–18 Costa Rica Panel in 2015 colones; for Nicaragua, average of 2009–17 FIDEG panel in 2017 córdobas.

Figure 1 summarizes a 'job ladder' in Costa Rica and Nicaragua by comparing monthly earnings by work status. In both countries, earnings are highest for formal self-employed and wage employees, followed by upper-tier informal self-employed; in Nicaragua, earnings for upper-tier self-employed are even slightly higher than those for formal self-employed. After upper-tier informal self-employed comes upper-tier informal wage employees. Earnings for lower-tier informal self-employed are higher than for lower-tier informal wage employees, but the differences between the mean earnings of workers in the two lower-tier informal statuses are small.
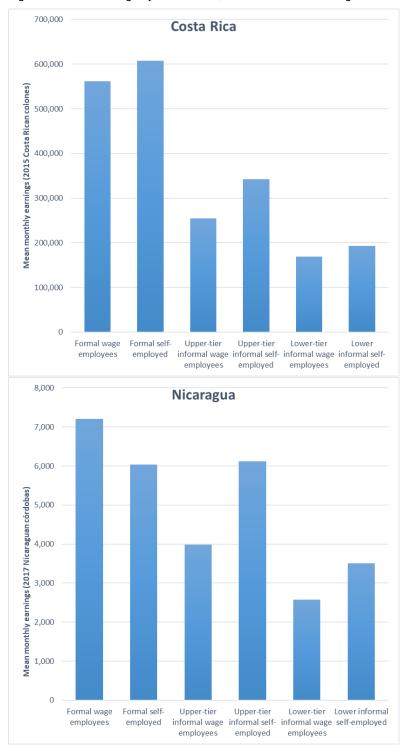
Figure 1: Mean earnings by work status, Costa Rica and Nicaragua

Source: authors' calculations based on the data described in Section 2.1.

Poverty rates for the household in which the worker lives have a similar ordering to monthly earnings. In Costa Rica, poverty rates are similar for the self-employed and wage employees in each work status. Formal self-employed and wage employees have the lowest poverty rates, followed by upper-tier informal self-employed and wage employees, and lastly lower-tier informal self-employed and wage employees. In Nicaragua, poverty rates are lower for the self-employed than for wage employees in each work status. The poverty rankings by work status are therefore somewhat more complex than in Costa Rica. In Nicaragua, poverty rates are the lowest for formal self-employed, followed by formal wage employees, followed by upper-tier informal self-employed; and poverty rates are higher for upper-tier informal wage employees than for lower-tier informal self-employed (the opposite of Costa Rica). The highest poverty rate is for upper-tier informal wage employees.

In summary, in both Costa Rica and Nicaragua, if we take monthly earnings as the most complete measure of labour income, there is a clear ordering: formal self-employment and formal wage employment earn the most. Next comes upper-tier informal self-employment, followed by upper-tier informal wage employment. At the bottom of the ladder comes lower-tier informal self-employment, with lower-tier informal wage employment as the lowest-earning sector (although the differences between lower-tier self-employed and wage employees are small).

3.3 Wage dynamics

Comparisons of average wages in each work status are an incomplete description of which are the best jobs for a given worker, because the observed and unobserved characteristics of workers in each work status may be different. Average wage changes do not say anything about the relative wages an observationally equivalent worker would earn in each work status. To address this issue we use the panel nature of the data to examine if wages for the same workers increase or decrease when these workers change work status, and we adjust for observable worker characteristics. We adjust for changes in observable characteristics when workers change work status with regression analysis of wage changes. Specifically, we estimate the following wage change equation for each origin work status (suppressing the subscript for individual observations):

$$(LnY_{t1} - LnY_{t0}) = B_0 + B_1 * LnY_{t0} + B_2 * X_{1,t0} + B_3 * \Delta X_1 + \sum_j B_{4j} * D_j + e$$

$$(1)$$

where $(LnY_{t1} - LnY_{t0})$ is the proportional change in wages between consecutive years $t0$ and $t1$ (alternatively, between t and $t + 1$), $X_{1,t0}$ is a vector of human capital and other individual level variables at $t0$ (education, vocational training, age, and gender), and ΔX_1 is a vector of changes in human capital between times $t0$ and $t1$. We also control for year and region fixed effects.

D_j is a set of dummy variables indicating if the worker changed work status between times $t0$ and $t1$. The reference category in each wage change regression $(D_j = 0)$ is that the worker did not change work status. For example, we estimate an equation using data on lower-tier informal wage employees at time $t0$. In this equation D_j equals zero if a worker remains a lower-tier informal wage employee at time $t1$. The other dummy variables indicate if the worker transitioned from lower-tier informal employment to one of the other working statuses (formal wage-employed, upper-tier informal wage-employed, lower-tier informal self-employed, upper-tier informal self-employed, and formal self-employed). The coefficients on each of these dummy variables measure the proportional change in the wages of workers who transitioned between lower-tier informal wage employment and another work status, relative to what that worker would receive if they had

remained in lower-tier informal (and controlling for the independent variables described in the previous paragraph). Proportional changes in these adjusted hourly wages given changes in sectors are reported in Table 4 (the full wage equation results are presented later in Table 8).

The wage dynamics suggest a different job ladder than do the mean earnings by work status. Probably the biggest difference is that the wage dynamics suggest that in both Costa Rica and Nicaragua wage employment is preferred to self-employment within upper-tier informal work. For example, wages fall when workers transition from upper-tier informal wage employment into upper-tier informal self-employment, while wages rise when the transition is in the opposite direction. In addition, in both Costa Rica and Nicaragua transitions between formal self-employment and formal wage employment do not lead to statistically significant wage changes, suggesting that there is no clear ordering between these two work statuses. The evidence for lower-tier informal self-employed compared with lower-tier informal wage-employed is that self-employment is preferred in Nicaragua but that neither is preferred in Costa Rica.

In Costa Rica, the wage dynamics suggest that formal wage employment has the best jobs: for all but one work status, wages increase when workers transition into formal wage employment and wages fall when workers transition out of formal wage employment into other work statuses. The exception is upper-tier informal wage employment: wages do not change significantly when workers transition between formal wage employment and upper-tier informal wage employment.

On the other hand, wages fall when workers transition from formal self-employment into upper-tier informal wage employment, suggesting that formal self-employment may be preferred. Upper-tier informal self-employment is the next most preferred. At the bottom of the job ladder are lower-tier informal workers.

In Nicaragua, the wage dynamics suggest that the most preferred jobs are also in formal wage employment and formal self-employment. With the exception of formal self-employment, when workers transition into formal wage employment wages increase. The next most preferred is upper-tier informal wage employment: wages increase when other types of informal workers transition into this status and fall when workers transition from this status into other types of informality. The next most preferred is upper-tier informal self-employment: wages fall when workers in this status move to either lower-tier informal wage-employment or self-employment, followed by lower-tier informal self-employment. The least preferred is lower-tier informal wage employment: transitions from this status into any other work status lead to higher wages, and transitions from any other work status into this status lead to lower wages.

Table 4: Adjusted monthly wage changes associated with transitions between working sectors

Costa Rica, 2011–18	1. Formal self-employed (t+1)	2. Upper-tier informal self-employed (t+1)	3. Lower-tier informal self-employed (t+1)	4. Formal wage employee (t+1)	5. Upper-tier informal wage employee (t+1)	6. Lower-tier informal wage employee (t+1)
1. Formal self-employed (t)		−0.158***	−0.399**	−0.0887	−0.195***	−0.337
		(0.0574)	(0.201)	(0.0851)	(0.0749)	(0.277)
2. Upper-tier informal self-employed (t)	0.216***		−0.0803	0.564***	0.173***	0.00218
	(0.0486)		(0.0672)	(0.0659)	(0.0571)	(0.129)
3. Lower-tier informal self-employed (t)	0.627***	0.0311		0.675***	0.363***	0.00127
	(0.149)	(0.0820)		(0.105)	(0.133)	(0.104)
4. Formal wage employee (t)	−0.0933	−0.716***	−0.636***		−0.170***	−0.657***
	(0.0931)	(0.0671)	(0.0811)		(0.0259)	(0.0531)
5. Upper-tier informal wage employee (t)	0.181**	−0.208***	−0.570***	0.235***		−0.334***
	(0.0795)	(0.0499)	(0.111)	(0.0297)		(0.0484)
6. Lower-tier informal wage employee (t)	0.253	0.143	−0.125	0.624***	0.366***	
	(0.358)	(0.140)	(0.0912)	(0.0613)	(0.0559)	
Nicaragua, 2010–17	1. Formal self-employed (t+1)	2. Upper-tier informal self-employed (t+1)	3. Lower-tier informal self-employed (t+1)	4. Formal wage employee (t+1)	5. Upper-tier informal wage employee (t+1)	6. Lower-tier informal wage employee (t+1)
1. Formal self-employed (t)		0.423	0.199	0.063	0.240	NA
		(0.456)	(0.441)	(0.565)	(0.417)	

2. Upper-tier informal self-employed (t)	0.138		−0.226***	0.253**	0.385***	−0.325*
	(0.167)		(0.061)	(0.130)	(0.068)	(0.160)
3. Lower-tier informal self-employed (t)	0.061	−0.002		0.183*	0.255***	−0.301***
	(0.181)	(0.066)		(0.096)	(0.301)	(0.090)
4. Formal wage employee (t)	−0.425	−0.333*	−0.018		−0.112***	−0.416***
	(0.34)	(0.200)	(0.162)		(0.364)	(0.120)
5. Upper-tier informal wage employee (t)	0.759*	−0.593***	−0.478***	0.058*		−0.133**
	(0.424)	(0.094)	(0.089)	(0.033)		(0.068)
6. Lower-tier informal wage employee (t)	0.328***	0.037	0.621***	0.231***	0.163***	
	(0.094)	(0.196)	(0.116)	(0.089)	(0.072)	

Note: heteroskedasticity-robust standard errors in parentheses. Wage changes are relative to the wage if the workers stay in the same sector at both time t and $t+1$. OLS regressions include the following controls: log of wage at time t; lagged wage; age and its square; gender dummy; regional dummies; primary, secondary, and tertiary education dummies for time t; the change in these dummies between t and $t+1$; dummy for non-formal (vocational) education at time t; the change in this dummy between t and $t+1$; fluency in English at time t; change in fluency between t and $t+1$; and year dummies. *** p<0.001, 88 p<0.05, * p<0.1.

Source: authors' calculations based on the data described in Section 2.1.

3.4   Other characteristics of workers in each work status

In both Costa Rica and Nicaragua, lower-tier informal workers (self-employed and wage employees) have the lowest education levels, formal workers (self-employed and wage employees) have the highest education levels, and upper-tier informal workers are in between.

In both countries, self-employed workers have more vocational training than wage employees at each work status. Among both the self-employed and wage employees, formal workers have the most vocational training, followed by upper-tier informal workers, followed by lower-tier informal workers. The only exception is in Costa Rica, where formal wage employees, formal self-employed, and upper-tier informal self-employed have similar average levels of vocational training.

In both Costa Rica and Nicaragua, lower-tier informal wage employees tend to be young: 64 per cent of lower-tier informal wage employees in Nicaragua and 48 per cent of lower-tier informal wage employees are between 15 and 29. Self-employed workers in all work statuses tend to be older than wage employees. For example, more than 38 per cent of upper-tier informal self-employed are 50 or older, compared with fewer than 16 per cent of upper-tier informal wage employees. In Costa Rica, 41 per cent of formal self-employed are 50 or older while only 19 per cent of formal wage employees are 50 or older.

The presence of women in each work status differs between Costa Rica and Nicaragua. In Costa Rica, the proportion of women is highest in upper-tier informal and lowest in lower-tier informal and formal self-employed. In Nicaragua it is the opposite: the proportion of women is highest in lower-tier informal and lowest in upper-tier informal and formal self-employed. In both countries, formal wage employment is in the middle. When we look only at women with young children, the results are more consistent across countries. In both countries, women with young children are over-represented in lower-tier informal work. For example, in Costa Rica approximately 55 per cent of women with young children are found in lower-tier informal work statuses, while in every other work status this proportion is less than 45 per cent. In Nicaragua, the difference between the proportion of men and women with young children in lower-tier informal work is greater than in any other work status.

For each work status (except formal wage employees), a larger proportion of workers is in agriculture in Nicaragua than in Costa Rica (see Table 5). In both Costa Rica and Nicaragua, the proportion of agricultural workers in lower-tier informal wage employment is the highest (along with upper-tier self-employment in Nicaragua). In both countries lower-tier informal wage employees are also found in household service, and in Costa Rica lower-tier informal wage employees are also found in construction. In both Costa Rica and Nicaragua, the lowest proportion of agricultural workers is found in formal wage employment.

Table 5: Descriptive statistics by work status, Costa Rica and Nicaragua

Education

Costa Rica, 2011–18

			Primary incomplete	Primary complete	Secondary complete	Some tertiary	Non-formal vocational training	In agriculture	Born in Nicaragua
Self-employed	Formal		8%	50%	18%	23%	34%	20%	3%
	Informal	Upper-tier	15%	56%	15%	14%	36%	22%	4%
		Lower-tier	23%	58%	12%	7%	25%	18%	12%
Wage employees	Formal		7%	40%	19%	34%	36%	12%	7%
	Informal	Upper-tier	17%	61%	13%	9%	25%	19%	8%
		Lower-tier	23%	61%	12%	4%	17%	27%	14%

Nicaragua, 2009–17

			Primary incomplete	Primary complete	Secondary complete	Some tertiary	Non-formal vocational training	In agriculture
Self-employed	Formal		24%	36%	14%	16%	34%	26%
	Informal	Upper-tier	33%	31%	6%	5%	36%	55%
		Lower-tier	30%	36%	9%	7%	25%	25%
Wage employees	Formal		9%	37%	18%	32%	36%	7%
	Informal	Upper-tier	27%	37%	11%	7%	25%	48%
		Lower-tier	27%	43%	10%	6%	17%	51%

Age

Costa Rica, 2011–18

							Female	With children under 12	
			15–19	20–29	30–49	50 and above		Male	Female
Self-employed	Formal		0%	6%	53%	41%	19%	40%	33%
	Informal	Upper-tier	1%	9%	47%	42%	42%	36%	44%

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			15–19	20–29	30–49	50 and above	Female	With children under 12 Male	With children under 12 Female
		Lower-tier	2%	18%	53%	27%	26%	40%	54%
Wage employees	Formal		2%	27%	52%	19%	37%	45%	42%
	Informal	Upper-tier	10%	22%	43%	25%	51%	42%	42%
		Lower-tier	11%	37%	39%	13%	26%	42%	56%

Nicaragua, 2009–17

			15–19	20–29	30–49	50 and above	Female	With children under 12 Male	With children under 12 Female
Self-employed	Formal		2%	9%	33%	57%	52%	61%	69%
	Informal	Upper-tier	3%	12%	52%	34%	36%	72%	70%
		Lower-tier	5%	20%	46%	29%	55%	67%	70%
Wage employees	Formal		3%	35%	46%	15%	43%	68%	70%
	Informal	Upper-tier	19%	36%	35%	10%	17%	71%	76%
		Lower-tier	33%	31%	27%	9%	55%	64%	73%

Source: authors' calculations based on the data described in Section 2.1; for Costa Rica, average of 2011–18 Costa Rica panel in 2015 colones; for Nicaragua, 2009–17 FIDEG panel in 2017 córdobas.

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Many Nicaraguans migrate to Costa Rica for work. In Costa Rica, Nicaraguan immigrants make up approximately 9 per cent of all workers and are concentrated in agriculture, construction, and household services (OECD and ILO 2018). Nicaraguan immigrants are disproportionally found in the lower-tier informality. We calculate that 14 per cent of lower-tier informal wage employees and 12 per cent of lower-tier informal self-employed were born in Nicaragua. This compares to 7 per cent in formal wage employment. Of course, because formal wage employment comprises the majority of Costa Rican workers, the majority of Nicaraguan immigrants are also formal wage employees.

A large proportion of formal wage employees are in public/government employment (public administration, teaching, health care, social assistance, etc.). Public sector workers make up about one-third of formal wage employees in both Costa Rica and Nicaragua. However, because formal employment is larger in Costa Rica than in Nicaragua, this implies a different proportion of total workers: 16 per cent of workers in Costa Rica are public, compared with only 4.5 per cent in Nicaragua.

Recall that a formal wage employee is defined as one whose employer pays for Social Security health insurance. In Costa Rica, we find that if an employer pays for Social Security then that employer is very likely to comply with other aspects of labour formality. For example, of formal wage employees in Costa Rica 95 per cent receive the *aguinaldo*, 90 per cent receive mandated sick days, and 91 per cent receive paid vacation. Consistent with this, other research that we have conducted in Costa Rica shows that policies designed to increase compliance with minimum wages can lead to more employers complying with other labour protections, and therefore to more informal workers becoming formal (Gindling et al. 2015).

Considering all of the evidence together suggests that formal is the most preferred work status. Formal wage employees are paid the most, work the most hours, have more stable employment, are more likely to benefit from a range of labour protections, and have the highest education levels. The formal self-employed have similar earnings, hours worked, and education levels, although self-employed work is less stable. The next most preferred jobs are upper-tier informal (both wage employment and self-employment), followed by lower-tier informal self-employment. Lower-tier informal wage employment is the lowest-paid work status in both Nicaragua and Costa Rica.

4   Employment transitions

Table 6 presents P_{ij}, the proportion of those in each origin work status i at time t who transition to another work status j or remain in work status i in year $t + 1$.

Table 6: Year-to-year conditional probabilities of transition, as a percentage of the initial number in each status in year t

Costa Rica		t+1 →	Self-employed			Wage employees			Not employed			Total
			Formal	Informal			Formal	Informal		Unemployed	Students	Out of labour force	
		t ↓		Upper-tier	Lower-tier			Upper-tier	Lower-tier				
Self-employed	Formal		48.5	34.6	1.0	3.5	6.8	0.6	1.1	0.2	3.8	100.0
	Informal	Upper-tier	12.6	45.1	4.1	5.0	10.3	1.8	2.5	1.7	17.0	100.0
		Lower-tier	2.3	21.1	33.7	6.8	8.1	11.0	4.9	1.5	10.5	100.0
Wage employees	Formal		0.4	1.4	0.5	86.5	3.5	1.5	3.0	0.7	2.5	100.0
	Informal	Upper-tier	2.2	8.4	1.3	12.7	42.4	5.9	5.4	5.3	16.5	100.0
		Lower-tier	0.6	4.5	5.8	15.2	20.7	27.9	9.9	4.3	11.2	100.0
Unemployed			0.6	4.7	2.4	22.3	11.0	7.9	22.8	9.8	18.6	100.0

Nicaragua		t+1 →	Self-employed			Wage employees			Not employed			Total
			Formal	Informal			Formal	Informal		Unemployed	Students	Out of labour force	
		t ↓		Upper-tier	Lower-tier			Upper-tier	Lower-tier				
Self-employed	Formal		18.0	29.5	16.4	9.0	6.6	4.1	0.0	0.0	16.4	100.0
	Informal	Upper-tier	0.9	56.6	15.2	1.7	9.8	6.3	0.8	0.3	8.5	100.0
		Lower-tier	0.8	20.5	40.0	2.4	10.8	7.6	1.4	0.8	15.7	100.0
Wage employees	Formal		0.6	1.7	2.2	75.7	9.8	1.8	2.4	0.4	5.5	100.0
	Informal	Upper-tier	0.1	7.8	6.8	9.3	56.1	8.8	3.0	1.7	6.4	100.0
		Lower-tier	0.1	7.8	6.7	2.8	14.4	46.4	1.1	4.7	15.9	100.0
Unemployed			0.2	5.8	10.7	15.9	26.4	6.8	13.2	2.9	18.1	100.0

Source: authors' calculations based on (for Costa Rica) Costa Rican panel 2011–17 and (for Nicaragua) FIDEG panel 2009–17.

A key question is whether informality is a persistent state where, once entered, workers are stuck and unable to transition to better-paid work statuses. The transitions reported in Table 6 do not support the argument that individual lower-tier informal workers are stuck in lower-informal work in either Costa Rica or Nicaragua. In both countries, the proportion of workers who remain in the same work status from year to year is lower in lower-tier informal work than in any other work status. This is true in both countries and in both lower-tier informal work statuses. While many of the workers who transition out of lower-tier informality leave employment or transition into another lower-tier informal work status, most workers who do so transition to higher-paid work statuses. For example, 41 per cent of lower-tier informal wage employees in year t in Costa Rica transition to either upper-tier informal or formal work statuses in year $t + 1$, compared with 31 per cent who transition to other work statuses or out of employment and 28 per cent who remain in lower-tier informal wage employment. In Nicaragua, 25 per cent of lower-tier informal workers in year t transition to higher-paying work statuses in the next year, compared with 29 per cent who transition to other work statuses or out of employment. When workers move from lower-tier informal wage employment, they are most likely to transition into upper-tier informal wage employment: in Costa Rica, 21 per cent of workers who are lower-tier informal wage employees in one year are upper-tier informal wage employees in the next year; in Nicaragua, the proportion is 14 per cent. A few lower-tier informal workers also transition directly into formal wage employment, although this is more common in Costa Rica than in Nicaragua: 15 per cent of lower-tier informal wage employees transition directly into formal wage employment in Costa Rica from year to year, compared with 2.8 per cent in Nicaragua.[5] This difference between Costa Rica and Nicaragua is at least partly due to the larger proportion of formal wage employees in Costa Rica.

Formal wage employees have the least mobility into other wage statuses, which is what we would expect if formal wage employment is rationed as predicted by the dualistic labour market segmentation model: 76 per cent in Nicaragua and 86 per cent in Costa Rica stay as formal wage employees from year to year, compared with less than 57 per cent who stay in any other wage status from year to year. Most of the formal wage employees who do move out of formal wage employment go into upper-tier informal wage employment or out of the labour force (possibly retiring). Very few formal employees transition to lower-tier informal wage employment or any type of self-employment.

Upper-tier informal wage employees are more mobile than formal wage employees but less mobile than lower-tier informal workers. In both Costa Rica and Nicaragua, when upper-tier informal wage employees do change work status, they are more likely to transition into better-paid formal wage employment than into lower-tier informal work. For example, 15 per cent of workers in upper-tier wage employment in Costa Rica in one year are formal wage employees the next; the proportion in Nicaragua is 9.3 per cent. This compares to 6 per cent in Costa Rica and 8.8 per cent in Nicaragua of upper-tier informal wage employees who transition into lower-paying informal wage employment.

Those in the formal and upper-tier informal self-employed statuses are also reasonably mobile. In both countries, when the formal self-employed transition they are most likely to move to upper-tier self-employment. The patterns of transitions out of upper-tier self-employment differ between

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[5] In Costa Rica, the proportion of lower-tier informal wage employees who transition directly into formal work is actually higher than the proportion of upper-tier informal wage-employees who transition directly into formal work. However, because upper-tier informal wage employment in Costa Rica is larger than lower-tier informal wage-employment the *number* of workers who transition from upper-tier informal wage-employment into formal work (1,024 in our sample) is higher than the number who transition from lower-tier informal wage-employment into formal work (431 in our sample).

Nicaragua and Costa Rica. In Costa Rica, upper-tier informal self-employed are most likely to transition up the job ladder into formal self-employment and upper-tier informal wage employment. In Nicaragua, upper-tier informal self-employed are most likely to transition down into lower-tier informal self-employment.[6]

While we find that individual lower-tier and upper-tier informal workers have substantial mobility up the job ladder into higher-paying wage statuses, we also find that some workers transition down the job ladder into lower-paying work statuses. If mobility upward is the same as mobility downward then the total number of informal workers might not change even if many individual workers transition into better-paying work statuses. However, this is not what we find. When we compare the *number* of transitions, we find that the number of workers who transition up the job ladder is greater than the number of workers who transition down the wage ladder. For example, in Nicaragua we found that 1,698 lower-tier informal workers in the sample transitioned into upper-tier informal work statuses, compared with 984 who transitioned from upper-tier informal into lower-tier informal. In Costa Rica, 1,101 workers in the sample transitioned from lower-tier informal work statuses into upper-tier informal work statuses, compared with 908 who transitioned from upper-tier informal work statuses into lower-tier informal work statuses. The number of transitions from upper-tier informal to formal work is also greater than the number who transitioned in the opposite direction. For example, in Nicaragua 414 workers in our sample transitioned from upper-tier informal work into formal wage employment compared with 302 who transitioned from formal to upper-tier informal wage employment. In Costa Rica 1,024 workers transitioned up the job ladder into formal wage employment compared with 812 who transitioned down the ladder into upper-tier informal wage employment. Transitions between upper-tier informal self-employment and wage employment and formal self-employment and wage employment show similar patterns. There were also more transitions from lower-tier informal wage employment into formal wage employment than in the opposite direction (415 vs 340 in Costa Rica and 97 vs 54 in Nicaragua).

In summary, the transition matrices suggest that there is substantial mobility of individual workers from lower-tier informal into upper-tier informal, and from upper-tier informal into formal, and even mobility from lower-tier informal directly into formal work status. However, there is also substantial churning as workers move between upper-tier informal, lower-informal, and formal work statuses; but even with this churning there are still more total transitions up the job ladder into higher-paying job statuses than down the ladder into lower-paying work statuses.

5   Characteristics correlated with improved work status and wages for informal workers

In this section, first we estimate work status transition equations to identify the observed characteristics associated with improved work status. Next we use estimates of wage dynamics (wage change) equations to identify the observed characteristics that are correlated with increasing wages for those workers who remain in the same work status.

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[6] In both Costa Rica and Nicaragua, relatively few people remain in unemployment from year to year (22 per cent in Costa Rica and 13 per cent in Nicaragua). When workers leave unemployment, they are most likely to transition into formal wage employment and upper-tier informal wage employment (or out of the labour force). This is consistent with unemployment as a state where workers queue for rationed jobs in formal and upper-tier informal wage-employment.

5.1 Characteristics correlated with transitions from informal employment into better work statuses

To provide evidence on improving the work and livelihoods of informal workers, we estimate multinomial logit (Costa Rica) and probit (Nicaragua) equations that examine the correlates of transitions between sectors. We estimate equations of the form:

$$Pr(S_{ij} = 1) = F(B_0 + B_2 * X_{1,t0} + B_3 * \Delta X_1 + B_4 * X_{2,t0} + B_5 * \Delta X_2 + B_6 * X_{3,t0})$$

(2)

Where S_{ij} is a discrete variable that takes on values for transitions from work status i to work status j, where i and j = lower-tier informal workers, upper-tier informal employees, upper-tier informal self-employment, formal self-employment, formal wage employment, unemployment, full-time student, and out of the labour force. j indicates a work status that is not i. $F(.)$ is the logit distribution (for logits) and the cumulative standard normal distribution (for probits). We present the marginal effects for each estimation. The marginal effect for each variable in each equation is interpreted as the change in the probability that a worker will transition from work status i to work status j when that independent variable changes by one unit.

Although we estimate transitions between all work statuses, in Table 7 we present only a subset of the results—specifically, results of the employment transitions equations from lower-tier informal (combining self-employed and wage employment) into upper-tier informal wage employment, upper-tier informal self-employment, formal wage employment, and formal self-employment. We also estimate employment transition equations for transitions between upper-tier informal work (combining self-employed and wage-employed) into formal wage employment and formal self-employment.

Table 7: Estimation of the characteristics correlated with transitions from lower-tier and upper-tier informal status (self-employed and wage-employed) into the formal and upper-tier informal status

7A: Costa Rica

Independent variables (marginal probabilities are reported, standard errors in parenthese)	Transitions from the lower-tier informal sectors				Transitions from the upper-tier informal sectors	
	To formal self-employed	To upper-tier informal self-employed	To formal wage employee	To upper-tier informal wage employee	To formal self-employed	To formal wage employee
Age	0.00264**	0.0116***	0.000356	0.000795	0.0133***	0.00514***
	(0.00107)	(0.00288)	(0.00321)	(0.00333)	(0.00137)	(0.00134)
Age2	−2.76e-05**	−0.000107***	−5.63e-05	−2.04e-05	−0.000139***	−0.000100***
	(1.27e-05)	(3.59e-05)	(4.36e-05)	(4.35e-05)	(1.58e-05)	(1.77e-05)
Female	−0.0124**	0.00126	−0.0459***	0.0563***	−0.0888***	−0.0524***
	(0.00560)	(0.0114)	(0.0134)	(0.0139)	(0.00531)	(0.00518)
Complete primary education	0.00747	0.0238*	0.0449**	−0.00848	0.0439***	−0.00558
	(0.00619)	(0.0141)	(0.0178)	(0.0173)	(0.00832)	(0.00896)
Complete secondary (academic and technical)	0.0160**	0.0527***	0.0981***	0.00334	0.0621***	0.0263**
	(0.00784)	(0.0201)	(0.0223)	(0.0250)	(0.0101)	(0.0108)
Some tertiary and post-graduate	0.0257***	0.0715***	0.108***	−0.0333	0.0992***	0.0390***
	(0.00860)	(0.0252)	(0.0284)	(0.0366)	(0.0103)	(0.0113)
Earn a primary education degree	0.00401	0.0382	0.0186	0.0655*	0.0209	−0.00193
	(0.0130)	(0.0273)	(0.0375)	(0.0335)	(0.0183)	(0.0200)
Earn a secondary education degree	0.0260***	0.0274	0.0173	−0.0898	0.0181	0.0240
	(0.00724)	(0.0370)	(0.0378)	(0.0600)	(0.0155)	(0.0156)
Earn some tertiary education	0.00524	0.0662*	−0.0618	0.0457	0.0300**	0.0269
	(0.0138)	(0.0393)	(0.0617)	(0.0635)	(0.0151)	(0.0174)

Non-formal vocational education	0.00254	0.0173	0.0426***	−0.0158	0.0162***	−0.00716
	(0.00484)	(0.0135)	(0.0139)	(0.0175)	(0.00517)	(0.00635)
Earn vocational education	0.00769	0.0358**	0.0570***	0.0287	0.0300***	0.0135*
	(0.00561)	(0.0174)	(0.0188)	(0.0225)	(0.00648)	(0.00818)
Fluency in English	0.00745	0.0272	−0.0413	−0.0908*	0.00621	0.0388***
	(0.00609)	(0.0266)	(0.0330)	(0.0476)	(0.00885)	(0.0102)
Increase fluency in English	0.00696	0.00862	0.0344	0.0540	0.0144	0.0444***
	(0.0146)	(0.0484)	(0.0461)	(0.0584)	(0.0139)	(0.0150)
Presence of a partner	0.0106**	0.0592***	0.0429***	−0.0110	0.0212***	−0.0148**
	(0.00435)	(0.0119)	(0.0138)	(0.0149)	(0.00565)	(0.00645)
Gain a partner	0.0123	0.0445	0.0526**	−0.0788**	0.0137	0.0204
	(0.01000)	(0.0288)	(0.0266)	(0.0398)	(0.0203)	(0.0170)
Lose a partner	−0.181***	−0.0266	0.0206	−0.0291	−0.0209	0.0263
	(0.0277)	(0.0338)	(0.0353)	(0.0448)	(0.0185)	(0.0177)
Number of children under 12 in household	−0.00136	−0.0100*	−0.0119*	0.00194	−0.00203	0.000489
	(0.00189)	(0.00550)	(0.00692)	(0.00656)	(0.00277)	(0.00346)
Change of children under 12	−0.00693*	−0.00132	−0.00308	0.00192	0.000201	0.00365
	(0.00382)	(0.00811)	(0.00941)	(0.0110)	(0.00468)	(0.00576)
Potable water	−0.00401	−0.0155	−0.0239	0.00985	−0.00317	0.0132
	(0.00567)	(0.0167)	(0.0177)	(0.0218)	(0.00720)	(0.00971)
Publicly provided sanitation system	0.000691	0.0139	0.00159	−0.0371*	−0.0131**	0.00802
	(0.00515)	(0.0140)	(0.0165)	(0.0193)	(0.00662)	(0.00730)
Central Valley	−0.00388	0.00286	0.000519	0.0434***	−0.00804*	0.0169***
	(0.00386)	(0.0104)	(0.0117)	(0.0132)	(0.00461)	(0.00547)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,480	3,480	3,480	3,480	11,968	11,968

7B: Nicaragua

Independent variables (marginal probabilities are reported, standard errors in parenthese)	Transitions from the lower-tier informal sectors			Transitions from the upper-tier informal sectors		
	To formal self-employed	To upper-tier informal self-employed	To formal wage employee	To upper-tier informal wage employee	To formal self-employed	To formal wage-employee
Age	−0.0002	0.0182***	0.0016**	−0.0002	0.0001	−0.0004
	(0.0002)	(0.0019)	(0.0007)	(0.0002)	(0.0001)	(0.0011)
Age2	0.000004*	−0.000193***	−0.000029***	0.000004	0.000000	−0.000014
	−0.000003	−0.000024	−0.000010	−0.000003	−0.000001	−0.000014
Female	0.0005	−0.0812***	−0.0061**	0.0005	0.0010**	−0.0053
	(0.0007)	(0.0087)	(0.0030)	(0.0007)	(0.0006)	(0.0045)
Complete primary education	0.0010	−0.0011	0.0086**	0.0010	0.0006	0.0102*
	(0.0011)	(0.0095)	(0.0043)	(0.0011)	(0.0006)	(0.0055)
Complete secondary (academic and technical)	0.0034	−0.0043	0.0264***	0.0034	−0.0005	0.0246***
	(0.0038)	(0.0167)	(0.0102)	(0.0038)	(0.0005)	(0.0102)
Some tertiary and post-graduate	0.0088***	−0.0112	0.0369***	0.0088	0.0037***	0.0713***
	(0.0070)	(0.0185)	(0.0135)	(0.0070)	(0.0031)	(0.0167)
Earn a primary education degree	0.0018	−0.0174	0.0225***	0.0018	0.0006	0.0067
	(0.0027)	(0.0170)	(0.0106)	(0.0027)	(0.0013)	(0.0103)
Earn a secondary education degree	0.0012	−0.0314	0.0058	0.0012	0.0045***	0.0013
	(0.0026)	(0.0212)	(0.0077)	(0.0026)	(0.0038)	(0.0106)
Earn some tertiary education	Omitted	−0.0578	0.0107	Omitted	0.0031	0.0631***
		(0.0276)	(0.0127)		(0.0059)	(0.0271)
Non-formal vocational education	0.0022*	−0.0142	0.0237***	0.0022	0.0008	0.0447***
	(0.0018)	(0.0121)	(0.0072)	(0.0018)	(0.0007)	(0.0084)

Earn vocational education	0.0019	0.0479***	0.0579***	0.0019	0.0024***	0.0597***
	(0.0021)	(0.0172)	(0.0118)	(0.0021)	(0.0016)	(0.0112)
Presence of a partner	0.0039***	0.0563***	−0.0018	0.0039	0.0008**	0.0109**
	(0.0016)	(0.0094)	(0.0034)	(0.0016)	(0.0005)	(0.0049)
Gain a partner	Omitted	0.0228	0.0096	Omitted	Omitted	0.0291**
	Omitted	(0.0265)	(0.0091)	Omitted		(0.0151)
Lose a partner	−0.0002	−0.0437*	−0.0075	−0.0002	0.0000	0.0250*
	(0.0017)	(0.0206)	(0.0069)	(0.0017)	(0.0009)	(0.0176)
Number of children under 12 in household	0.0001	0.0060**	0.0013	0.0001	0.0000	−0.0026
	(0.0003)	(0.0031)	(0.0011)	(0.0003)	(0.0004)	(0.0048)
Change of children under 12	0.0007*	0.0077	−0.0001	0.0007	0.0002**	−0.0004
	(0.0004)	(0.0053)	(0.0020)	(0.0004)	(0.0001)	(0.0017)
Potable water	0.0011	−0.0025	−0.0002	0.0011	0.0001	0.0005
	(0.0008)	(0.0093)	(0.0033)	(0.0008)	(0.0002)	(0.0028)
Electricity	Omitted	−0.0087	0.0003	Omitted	0.0003	0.0238***
		(0.0154)	(0.0062)		(0.0006)	(0.0063)
Publicly provided sanitation system	Omitted	−0.0428***	0.0090**	Omitted	0.0005	0.0360***
		(0.0115)	(0.0033)		(0.0004)	(0.0046)
Residential telephone	0.0010	0.0483***	0.0021	0.0010	0.0002	0.0021
	(0.0015)	(0.0215)	(0.0057)	(0.0015)	(0.0006)	(0.0080)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,428	6,428	6,428	4,302	8,038	8,308

Note: standard errors in parentheses; lower-tier informal sectors include informal self-employed and wage employeesl results for transitions into unemployment, full-time student, and out of the labour force are not included in this table but are available from the authors; *** p<0.01, ** p<0.05, *<0.1.

Source: authors' calculations based on the data described in Section 2.1.

The independent variables in the transition equations include personal and household characteristics. Specifically, $X_{1,t0}$ is a vector of human capital and other individual-level variables at $t0$ (education and vocational training, plus age and gender), ΔX_1 is a vector of changes in human capital between times $t0$ and $t1$, $X_{2,t0}$ is a vector of family-level variables at time $t0$ (presence of a partner, number of children under 12 years old), ΔX_2 is a vector of changes in family variables, and $X_{3,t0}$ is a vector of public utilities that each individual has access to as government-provided public services (sanitation, potable water, and electricity). We also control for year fixed effects.

The interpretation of the impact of changes in independent variables on transitions depends on whether those variables are levels or changes. For example, the education level that a worker has was likely earned before that worker entered the labour force. If levels of education promote transitions, this might indicate that formal employers are simply choosing those who already have the most education (who are presumably the most productive) to hire into rationed high-wage jobs. On the other hand, if earning an education while employed promotes transitions into higher-wage work statuses, then this is stronger evidence that earning an education may increase the probability of a worker already employed in informal jobs transitioning to a higher-wage job. Changes in independent variables are under the control of workers and are therefore more useful for policy-makers who are looking for policies to promote better jobs for informal workers.

In both Costa Rica and Nicaragua, earning vocational training (a change variable) increases the probability of a transition out of lower-tier informal work statuses into formal wage employment and upper-tier informal self-employment. Earning a vocational education also increases the probability of a transition out of upper-tier informal work into both formal wage employment and formal self-employment. On-the-job vocational training is the most consistent correlate of transitioning from an informal sector into a better-paying sector and is therefore a possible focus of public policy.

In both Costa Rica and Nicaragua, higher education levels promote transitions from all informal work statuses into formal wage employment. There is also evidence in both countries that earning a tertiary education promotes transitions from upper-tier informal into formal work and from lower-tier informal work into upper-tier informal work. In addition, earning a secondary education can promote transitions into formal self-employment. Note that most workers enter the workforce with their primary and secondary education already at the highest levels they will reach. This may help to explain why earning a tertiary education has a bigger impact on the probability of transitioning into a better work status than does earning a primary education: more workers complete their tertiary education after entering the workforce. In summary, the evidence suggests that earning an education and having a higher education level are important correlates of an increase in the probability of transitioning from informal work into a better work status.

In both countries, an older age (a proxy for experience) promotes a transition from lower-tier informal work into upper-tier informal self-employment. In Costa Rica, an older age also promotes a transition from both lower-tier and upper-tier informal into formal self-employment. The impact of age/experience has diminishing marginal returns: the probability that a worker transitions into higher-paid self-employment is maximized around the upper 40s. In Costa Rica, older workers are also more likely to transition from upper-tier informality into formal wage employment and self-employment. This suggests that workers who start out in informal work statuses may be gaining experience as lower-tier workers before becoming successfully self-employed.

As vocational training, formal education, and experience are forms of human capital, our results suggest that informal workers who increase their human capital on the job are more likely to transition into better work statuses.

Compared with men, women are less likely to transition from informal work into formal wage employment and formal self-employment than men in both Costa Rica and Nicaragua. This suggests that women may be disadvantaged in their ability to obtain rationed formal employment.

Household structure also matters for transitions to better work statuses. For example, having a partner (i.e. spouse) is generally positively correlated with transitions from informal work into better work statuses.

5.2 Characteristics correlated with higher wages for workers who remain informal

Table 8 presents the full wage change regression results described in Equation 1. We do not present the coefficients on the variables that indicate changes in work status because these results are already reported in Table 4. The coefficients on the independent variables in Table 8 can be interpreted as the effect on the wage changes of workers in each work status if those workers remain in that work status. It is these correlates that we concentrate on in this subsection.

Table 8: Wage change regressions, Costa Rica and Nicaragua

8B: Costa Rica

	Upper-tier informal self-employed	Lower-tier informal self-employed	Upper-tier informal wage employment	Lower-tier informal wage employment
Log of hourly wage in t	−9.90e-05***	−0.000182***	−0.000163***	−0.000419***
	(1.01e-05)	(4.55e-05)	(1.45e-05)	(3.60e-05)
Age	−0.00589	0.00589	−0.00158	0.0224**
	(0.0121)	(0.0211)	(0.00515)	(0.0108)
Age squared	8.45e-05	−3.81e-05	4.49e-05	−0.000277*
	(0.000139)	(0.000258)	(6.48e-05)	(0.000148)
Female	−0.00712	0.0165	−0.0158	−0.00174
	(0.0418)	(0.106)	(0.0222)	(0.0526)
Complete primary education	−0.0111	0.145	0.0273	0.0376
	(0.0600)	(0.0881)	(0.0361)	(0.0527)
Complete secondary education	0.0739	0.0784	0.0747	0.141*
	(0.0790)	(0.148)	(0.0455)	(0.0819)
Some tertiary and post graduate eduaction	0.247***	0.392**	0.385***	0.256**
	(0.0776)	(0.168)	(0.0535)	(0.113)
Earn a primary education degree	−0.217	−0.0538	0.121	0.00498
	(0.132)	(0.209)	(0.0781)	(0.102)
Earn a secondary education degree	−0.0732	0.0473	0.0372	0.0884
	(0.127)	(0.182)	(0.0748)	(0.174)
Earn a tertiary education degree	−0.115	0.441	0.108*	0.584***
	(0.122)	(0.295)	(0.0629)	(0.209)

Vocational training	0.00657	−0.131*	−0.0463*	0.0162
	(0.0414)	(0.0794)	(0.0262)	(0.0546)
Earn training	−0.0112	0.124	−0.0129	0.0944
	(0.0667)	(0.114)	(0.0338)	(0.0737)
Fluency in English	0.149*	0.218	0.173***	0.232*
	(0.0831)	(0.178)	(0.0559)	(0.137)
Change in English fluency	0.0354	0.249	0.108	0.350
	(0.118)	(0.264)	(0.0709)	(0.291)
Central Valley	0.0236	−0.0439	0.0192	0.0164
	(0.0367)	(0.0746)	(0.0217)	(0.0402)
Year fixed effects	Yes	Yes	Yes	Yes
Wage status dummy variables	Yes	Yes	YES	Yes
	0.308	−0.0252	0.223**	0.0387
Constant	(0.260)	(0.441)	(0.105)	(0.199)
Observations	4,090	1,021	4,803	1,319
Adjusted R-squared	0.140	0.220	0.145	0.286

8B: Nicaragua

	Upper-tier informal self employed	Lower-tier informal self-employed	Upper-tier informal wage employment	Lower-tier informal wage employment
Log of hourly wage in t	−0.5993***	−0.6635***	−0.6583***	−0.6227***
	(0.0203)	(0.0233)	(0.0309)	(0.0607)
Age	0.0575***	0.0503***	0.0138**	0.0159
	(0.0152)	(0.0129)	(0.0065)	(0.0147)
Age squared	−0.0006***	−0.0006***	−0.0002*	(0.0002)
	(0.0002)	(0.0002)	(0.0001)	(0.0002)
Female	0.0297	−0.0650	−0.0387	(0.1094)

	(0.0503)	(0.0505)	(0.0410)	(0.0852)
Complete primary education	0.2524***	0.1828***	0.1518***	0.0272
	(0.0553)	(0.0582)	(0.0310)	(0.0658)
Complete secondary education	0.2959***	0.3470***	0.2120***	0.0412
	(0.1032)	(0.0941)	(0.0455)	(0.0997)
Some tertiary and post graduate eduaction	0.7288***	0.5831***	0.4344***	0.2566**
	(0.1116)	(0.1141)	(0.0646)	(0.1216)
Earn a primary education degree	0.2846**	−0.0274	0.0851	0.1261
	(0.1205)	(0.1041)	(0.0671)	(0.1148)
Earn a secondary education degree	−0.2814*	0.0937	−0.0070	0.0986
	(0.1512)	(0.1494)	(0.0734)	(0.1210)
Earn a tertiary education degree	0.2475	0.3065	0.1304	−0.0693
	(0.2358)	(0.2501)	(0.0867)	(0.2808)
Vocational training	0.0356	-0.0901	0.0732	-0.0019
	(0.0591)	(0.0690)	(0.0480)	(0.1555)
Earn training	0.0187	−0.0194	0.1585***	0.2342***
	(0.0782)	(0.0890)	(0.0463)	(0.0904)
Year fixed effects	Yes	Yes	Yes	Yes
Wage status dummy variables	Yes	Yes	Yes	Yes
	0.3240	0.8683***	1.7201***	1.5497***
Constant	(0.3144)	(0.2663)	(0.1346)	(0.2871)
Observations	2,498	1,775	3,046	464
Adjusted R-squared	0.3332	0.3747	0.2799	0.348

Note: robust standard errors in parentheses; *** significant at 1%, **significant at 5%, *significant at 10%.

Source: authors' calculations based on the data described in Section 2.1.

In Nicaragua, earning vocational training increases the wages for upper-tier and lower-tier informal wage employees who remain in those work statuses. In Costa Rica, fluency in English (which is the most popular programme in the National Apprentice Institute) also increases earnings for upper-tier and lower-tier informal wage employees. This evidence suggests that providing vocational training to informal wage employees could contribute to higher earnings for those who remain in that work status.

In both Costa Rica and Nicaragua, earning additional education while employed has little effect on the wages of workers who remain in lower-tier informal wage employment. Earning a tertiary education increases earnings in lower-tier informal wage employment, but is not significant for any other types of education. Having a tertiary education is a significant correlate for transitioning into better work statuses. However, other education levels are not significant correlates of earnings for those who remain informal in Nicaragua, although they are significant in Costa Rica (except for lower-tier informal wage employment).

Age (a proxy for experience) is correlated with higher wages for those who remain in lower-tier informal wage employment in Costa Rica, but not in Nicaragua. In Nicaragua, age is correlated with higher wages for those who remain in informal self-employment and in upper-tier informal wage employment, but not in Costa Rica. Wage changes for those who remain informal do not differ between men and women.

In summary, we find evidence of few things that informal workers can do to positively affect their wages if they remain in the same informal work status. The strongest evidence of a variable increasing wages is related to vocational training, which is positively correlated with higher wages for those who remain informal.

6   Conclusions

Our results suggest that it is important to distinguish between lower-tier and upper-tier informal workers and between the self-employed and wage employees. Employment and wage transition patterns are different for different informal work statuses, as are the characteristics of workers in each work status and the characteristics of workers that are associated with moves up the job ladder.

We find that in both Costa Rica and Nicaragua there is a clear ordering of work statuses. Earnings are highest for formal work (among both the self-employed and wage employees), next-highest for upper-tier informal, and last for lower-tier informal. We also find that in both Nicaragua and Costa Rica mobility out of the worst work status, lower-tier informal work, is greater than out of all other work statuses. There is also substantial mobility out of upper-tier informal work into formal work status. Formal wage employment is the least mobile work status. This suggests that individual workers in Costa Rica and Nicaragua are not stuck in lower-tier informal work and that there is scope for promoting transitions from lower-tier and upper-tier informal work into better-paying work statuses.

While we find that individual lower-tier and upper-tier informal workers have substantial mobility up the job ladder into higher-paying wage statuses, we also find that some workers transition down the job ladder into lower-paying work statuses. If mobility upward is the same as mobility downward then the total number of informal workers may not change even if many individual workers transition into better-paying work statuses. However, this is not what we find. When we compare the number of transitions, we find that the number of workers who transition up the job

ladder is greater than the number of workers who transition down the wage ladder. The number of transitions from lower-tier informal work directly into formal work is greater in Costa Rica than in Nicaragua, at least partly due to the larger size of formal wage employment and self-employment in Costa Rica.

Informal workers can improve earnings and livelihoods by moving to better work statuses, or by staying as informal workers and improving their earnings. In both Costa Rica and Nicaragua, earning vocational training increases the probability of a transition out of lower-tier informal work statuses into upper-tier informal wage employment, and increases the probability of a transition out of upper-tier informal work into formal wage employment and formal self-employment. In both countries, higher education levels promote transitions from all informal work statuses into formal wage employment. There is also evidence in both countries that earning a tertiary education promotes transition from upper-tier informal into formal work and from lower-tier informal into upper-tier informal work. An older age (a proxy for experience) promotes transition from lower-tier informal work into upper-tier informal self-employment in both Costa Rica and Nicaragua, and from upper-tier informal into formal self-employment and wage employment in Costa Rica. As vocational training, formal education, and experience are forms of human capital, our results suggest that informal workers who increase their human capital on the job are more likely to transition into better work statuses. As the probability of transitioning to a better work status increases with age until the mid- to upper 40s, these results also suggest that vocational training should not be only for the young, but should be available to informal workers throughout their prime working lives.

Other work that we have done in Costa Rica shows that policies designed to increase compliance with labour regulations can lead to more employers complying with all labour protections and Social Security payroll taxes, and therefore to more informal workers becoming formal (Gindling et al. 2015). These policies included public relations campaigns, increased enforcement, and incorporating workers into the enforcement process.

On the other hand, we find few things that informal workers can do to positively affect their wages if they stay informal. The strongest evidence is related to vocational training, which is positively correlated with higher wages for those who remain informal.

The strongest of our results suggest policies of providing vocational training to informal workers as a way of improving wages for those who remain informal and of promoting transitions into better-paying work statuses. Earning other types of human capital, such as formal education, also improves a worker's chances of transitioning into higher-paying work status. Overall, our results suggest that policies that promote investment in human capital for currently employed informal workers are an effective way to improve the livelihoods of informal workers in Costa Rica and Nicaragua.

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