

Place-Based Policies and the Transition from Informal to Formal Employment.

Evidence from Vietnam

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Preliminary and incomplete

Abstract

This paper examines how industrial and economic zones affect labor market allocation from informal to formal employment in Vietnam. We use difference-in-differences approach with household and individual fixed effects to ensure that control and treatment groups were not different before the policies were implemented. We find that households in the zones had 40% more members working for more than one job. In addition, the hours and number of workers working in the informal sector increased by 40%. We do not find evidence for changes in total working hours, suggesting a reserve transition from formal to informal employment. This paper extends the literature on place-based policies, which mostly focuses on firms and formal employment, and the literature on informality whose main sources of identification are trade-shocks.

As for next steps, we will examine whether the industrial and economic zones in Vietnam led to regional economic growth. If so, this paper provides evidence for alternative (minority) views on how economic growth affects multiple-job holding and informal employment in developing countries. Alternatively, it could be that the industrial and economic zones in Vietnam deteriorated the regional economic development. If so, our empirical results are consistent with the traditional (majority) views. Industrial and economic zones could deteriorate regional economic development is itself an important result, since they are one of the main policies that many developing countries use to promote economic growth.

Introduction

Many countries use place-based policies to stimulate regional and national economic growth. Notable examples are industrial and economic zones where businesses investing in these designated areas receive tax cuts, cheaper and better infrastructure, and easier access to credit. Most of the existing papers study the formal sector. Informal sector accounts for a large portion of employment in developing countries. One of the major policies in developing countries is to

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formalize the informal sector, because, in part, it is easier to administer and collect taxes in the formal sector. Thus, it is important to examine how place-based policies affect employment in the informal sector, and how they affect the transition of employment from the informal sector to the formal sector.

This paper examines how industrial and economic zones (the zones) affect labor market allocation from the informal sector³ to the formal sector in Vietnam. Industrial zones and economic zones in Vietnam give businesses in the zones preferential treatments in corporate income taxes, financial supports, land rent, and, in some years, personal income taxes. The national government solicits proposals from the districts to decide where to build the zones. The proposals have to provide evidence for why a region is economically and geographically suitable to build a zone, and that such zone would be viable to generate economic growth.

We collect a comprehensive list of industrial and economic zones in Vietnam as of December 2016. We match the zone list with the Vietnam Household Survey (VHLSS) individual and household panel data that are collected once every two years from 2002 to 2014. We run difference in differences regressions with household and individual fixed effects to compare the treatment (households or individuals in a zone after establishment) and control (outside of the zones or in a zone before establishment) groups before and after the zones were established.

The identifying assumption is that treatment and control households or individuals would be identical in absence of the zones. To alleviate concerns that the assumption is violated, we show that treatment and control groups exhibit similar trends before the policies were implemented.

We find that, after three years of the zones' establishment, households located in the zones had 40% more family members working for more than one job. Hours of working in the informal sector in the zones also increased by 40%. In addition, we do not find evidence for changes in total working hours in a household. Because our sample only includes working age people who either works in the formal or informal sectors, our result suggests that formal employment did not increase.

This paper relates to the three strands of literature. The first strand of the literature is the place-based policies literature, which has mostly focused on the formal sector. Evidence whether place-based policies worked in the US is mixed. Busso et al. (2013) shows that Empowerment Zones in the US increased employment in the zone areas and wages for local workers, but it did not increase population or cost of living. However, studies that examine state level enterprise zones in the US find mixed evidence (Bondonio and Greenbaum (2007); Elvery (2009); Ham et al. (2011); and Neumark and Kolko (2010)).

In developing countries, place-based policies also exhibit mixed results. In China, Wang (2013) and Lu et al. (2015) find that special economic zones promoted regional economic growth, increased wages, and did not increase cost of living. Additionally, firm's birth and death explain more of an increase in capital, employment, and output than incumbents and relocations in

³ According to McCaig and Pavcnik (2017), employment in the household sector in Vietnam is informal employment.

China. However, the studies did not find regional spillovers in China. In India, Blakeslee et al. (2017) shows that industrial areas reallocated labor from subsistence agricultural to manufacturing. Specifically, workers left agricultural for non-agricultural employment, and farmers that had previously engaged in subsistence agriculture shifted to commercial farming. Additionally, the industrial areas caused a large increase in the number of firms and employment that were substantial spillover to neighboring villages. On the other hand, in Indonesia, Rothenberg et al. (2017) shows that special economic zones did not promote regional economic growth, potentially because economic zones in Indonesia are in economically backward areas. On the contrary, economic zones and industrial areas in China and India were chosen because, in theory, they have regional resources to be successful.

The second strand of the literature is on economic growth and informality in developing countries whose main sources of identification are trade-shocks. Theoretically, the traditional view (e.g. Harris and Todaro 1970, Fields 1975, Chandra and Khan 1993) predicts that informality will disappear as the economy develops. An alternative view (e.g. Fajnzylber et al. 2006, Bennett and Estrin 2007) believes that the informal sector provides flexible work hours, locations, and environment. Thus it will continue to exist and perhaps expand as the economy grows.

Empirically, McCaig and Pavcnik (2017) show that a positive trade shock makes individuals move from working for household sectors (informal employment) to formal businesses (formal employment) in Vietnam. In contrast, Goutam et al. (2017) shows that demand-induced trade shocks increased labor force participations in all types of workers in Bangladesh: formal employment, casual employment, unpaid employment, and self-employment. Additionally, Bosh et al. (2007) and Goldberg and Pavcnik (2003) find no or weak effects of trade shocks on informal employment in Brazil and Colombia.

A third strand of literature is on multiple-job holding. The first theory considers multiple-job holding exists because the main job is insecure and does not provide enough income and hours to workers (Shishko and Rostker (1976), and Bell et al. (1997)). The second theory argues that people hold multiple jobs because they have multiple interests, and the side jobs help individuals prepare for entrepreneurship (Lundborg(1995), and Conway and Kimmel(1998)). Development economists generally agree with the first theory of the multiple-job holding.

This paper studies economic and industrial zones (not trade-shocks) and the informal sector (not the formal sector). This paper shows that the economic and industrial zones in Vietnam caused more people in the household work for more than one job and increased the numbers of workers and hours working in the informal sector. Interestingly, we do not find hours of work in the households increase, which suggests that formal employment (people that do not work for household sectors) does not increase. Together, the results of this paper imply that the zones increase informal employment relatively to formal employment.

As for next steps, we will examine whether the industrial and economic zones in Vietnam led to regional economic growth. If so, this paper provides evidence for alternative (minority) views on how economic growth affects multiple-job holding and informal employment in developing

countries. Alternatively, it could be that the industrial and economic zones in Vietnam deteriorated the regional economic development. If so, our empirical results are consistent with the traditional (majority) views. Industrial and economic zones could deteriorate regional economic development is itself an important result, since they are one of the main policies that many developing countries use to promote economic growth.

Industrial zone and economic zones in Vietnam

Industrial zones and economic zones in Vietnam give firms differential treatment in corporate income tax, financial supports, land rent, and in some years, personal income taxes. In general, economic zones usually receive more incentives than industrial zones.

Special economic zones are national-level projects and are chosen based on their potential to success. A commune or a group of communes want to become an economic zone will have to propose to the district level. If the proposal passes the district level, it will go up to the national government. Sometimes, the whole district wants to become a special economic zone. At that point, districts will have to write a proposal to give to the national government. The national government assesses the success of the economic zones based on different proposals and decide whether to set up ones.

Industrial zone has a smaller scale than special economic zone and can usually get passed at the district level. It will finally go up to the national level for the president to sign, but the screening process is less stringent.

I. Data

II. Data Description

The primary data in this paper is the Vietnam Household Living Standards Surveys (VHLSS), which is conducted every two years by the General Statistics Office (GSO) of Vietnam between 2002 and 2014. Where 50% of households and individuals are re-surveyed in the second round and 25% in the third round. This design allows building an individual panel or a household one up to three-round of VHLSS.

There exist only three three-round panels of VHLSS from 2002 to 2014 as the master sample design.⁴ By using the method introduced by GSO, the three-round individual and household panels are established to trace individuals and households re-surveyed in the later rounds. These panels are the 2002-04-06 and 2004-06-08 and 2010-12-14 panels. However, the quality of matched individuals and households amongst rounds of VHLSS from 2002 to 2006 is reduced as a consequence of miscoding in VHLSS.⁵

⁴ VHLSS from 2002 to 2008 uses the database of the Population Census 1999 of Vietnam to build the master sample as a random sample of the Population Census 1999 enumeration areas while VHLSS from 2010-2014 uses the Housing and Population Census 2009.

⁵ This issue is noted in McCaig (2009) that almost ten percent of total matches is incorrect in household panel between 2002 and 2004. McCaig, B. (2009). The Reliability of Matches in the 2002-2004 Vietnam Household Living

The main or the most time-consuming job of household members ages 20-64 are focused in the analysis. The main variables of interest involve in the employment opportunity and the transformation of employment structure within the household stemming from the establishment of an industrial or economic zone in the commune. The individual and household head's demographic and educational characteristics such as gender, age, minority status and years of schooling are created. Besides, geographic characteristics including urban residence and regional areas are also created. This information is retrieved from the questionnaire of VHLSS.

Table. Number of industrial and economic zones in operation

Year	2002	2004	2006	2008	2010	2012	2014
Number of industrial zones	74	100	140	187	207	217	217
Number of economic zones	0	15	58	102	136	136	146

Source: Ministry of Planning and Investment (MPI) of Vietnam.

In the next step, we use the commune-level data of industrial and economic zones provided by MPI to match with individual and household data of VHLSS, respectively. Accordingly, we obtain three three-wave household panels (i.e., the three-wave household panels of 2002-04-06, 2004-06-08, and 2010-12-14) covering 15,116 observations, and the three-wave individual panels (i.e., the three-wave individual panels of 2002-04-06, 2004-06-08, and 2010-12-14) with 34,858 individuals between 2002 and 2014. Where there are 754 households corresponding to 1,748 individuals in the communes that there is at least one industrial or economic zone located.⁶

Table. Summary of households in the commune where industrial and economic zones located

Round of VHLSS	Household panel						Total
	Households in in the commune without industrial zone	Households in in the commune with at least one industrial zone located	Total	Round of VHLSS	Households in in the commune without industrial zone	Households in in the commune with at least one economic zone located	
2002	1,691	72	1,763	2002	1,740	23	1,763
2004	3,118	122	3,240	2004	3,199	41	3,240
2006	3,084	119	3,203	2006	3,162	41	3,203
2008	1,517	48	1,565	2008	1,547	18	1,565
2010	1,727	72	1,799	2010	1,777	22	1,799
2012	1,717	72	1,789	2012	1,767	22	1,789
2014	1,685	72	1,757	2014	1,735	22	1,757

Standards Survey Panel The Australian National University Centre for Economic Policy Research - Discussion Paper. No. 622.

⁶ There are households situated in both the industrial zone and the economic zone.

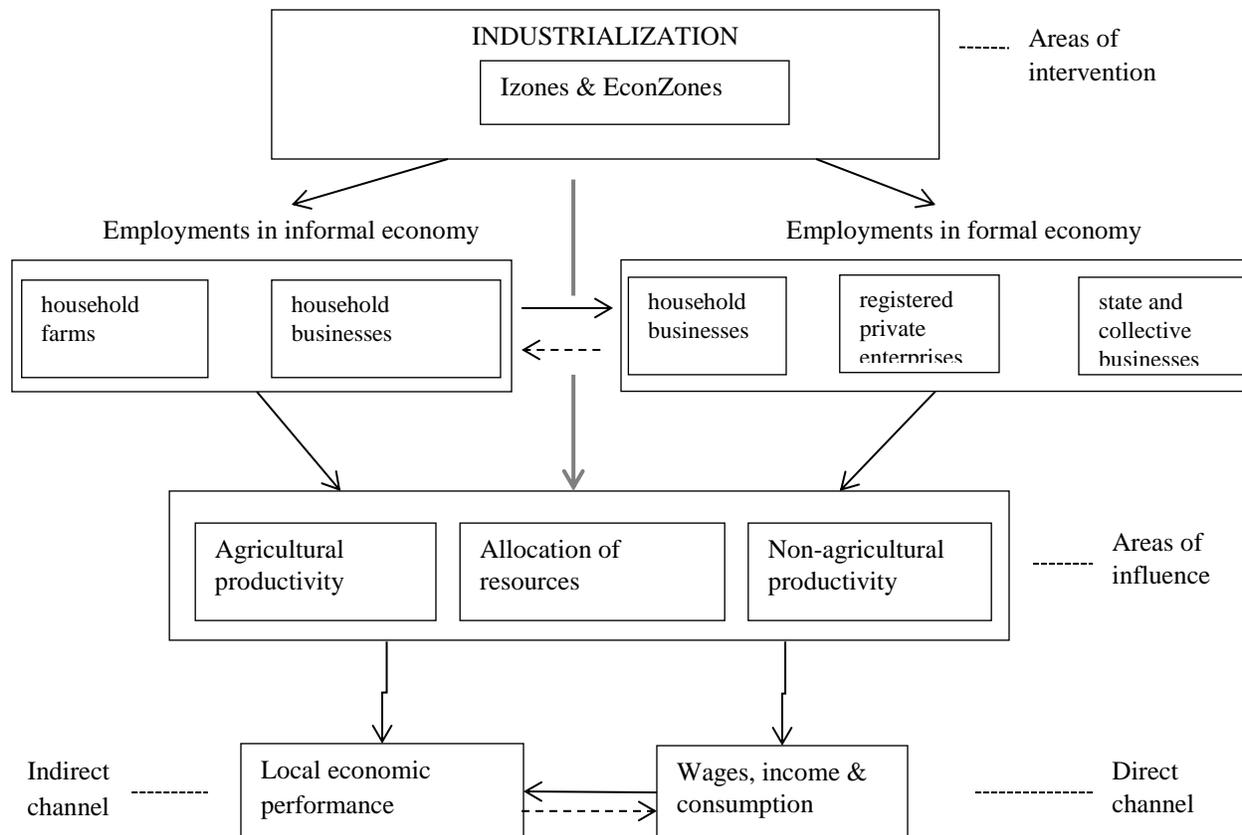
Total	14,539	577	15,116	Total	14,927	189	15,116
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Table. Summary of individuals in the commune where industrial and economic zones located

Round of VHLSS	Individual panel						Total
	Individuals in in the commune without industrial zone	Individuals in in the commune with at least one industrial zone located	Total	Round of VHLSS	Individuals in in the commune without industrial zone	Individuals in in the commune with at least one economic zone located	
2002	3,751	165	3,916	2002	3,874	42	3,916
2004	7,083	266	7,349	2004	7,266	83	7,349
2006	7,202	282	7,484	2006	7,401	83	7,484
2008	3,628	122	3,750	2008	3,706	44	3,750
2010	3,917	166	4,083	2010	4,025	58	4,083
2012	3,979	168	4,147	2012	4,082	65	4,147
2014	3,960	169	4,129	2014	4,061	68	4,129
Total	33,520	1,338	34,858	Total	34,415	443	34,858

As described in the figure below, it is hypothesized that the establishment of industrial and economic zones impacts on the local economy through several channels including the transformation of labor and employment structure, immigration (labor or worker mobility), income and remittance (family-supporting money), productivity, environment and social issues.

Figure. Industrialization and structural change in a transition economy



In the individual data, a dummy variable of variety of employments is created to proxy for the available opportunity of employment in the labor market. It takes value one if an individual performs more than one job within last 12 months. To investigate the impact of the establishment of industrial and economic zones on the transformation of employment structure, a set of dummy variables are created including self-employment, nonfarm employment, household business, and household sector. Besides, the numeric variables of employment defined as monthly working hours on average are also used to examine the change in these sectors.

Self-employment is defined for both household and household member in VHLSS. Where self-employment dummy of the household member is working for the household but receiving no remuneration in terms of salary, wage or profits. Individuals in this category carry out non agro-forestry and fisheries production activities run or owned by the household owner or a member. While the dummy of household sector is defined as either household member carries out agro-forestry and fisheries production activities independently by themselves or this individual independently manages/operates non-agricultural business activity of household. The dummy of nonfarm employment is classified by the list of profession classification of GSO based on the nature and content of work of the laborers.

As the significant inconsistency of definition in the questionnaire of VHLSS, there is a difference in our definition of household business. This variable is defined in terms of the worker's employer type, and takes the value one if a household member works for other

households from 2002 to 2008 and if he or she works in independent production or business households between 2010 and 2014; and zero otherwise.⁷

For the household's employment variables, in each round of VHLSS, the data is aggregated from the data level of household's members aged 20-64. This means that only individuals or family members age 20-64 are used to calculate the dependent variables in the household panel data. This sampling and method are consistent with the individual panel data. Consequently, several dummies in the individual data then become numeric variables. For example, the variable that proxies for the increasing opportunity of employment in the labor market is now the number of household members who involve in more than one jobs within last 12 months.

The index of household's burden is defined as the number of household's dependent burdens per number of household's working-age adults. Where the household's working-age adults are defined as the legal working age including the family members ages 15-60 for male and 15-55 for female, and the household's dependent burdens are the family members who are not in the legal working age. The highest educational attainment of individual and household head is defined as a number of years of schooling. The index of household's dependent burden is a better control variable compared to the other variables such as a number of children or number of household's dependents as these variables are relatively correlated with household size.

Table. Summary and definition of variables

Code of variable	Type of variable	Name of variable	Definition (the most time-consuming job within the last 12 months if it's not the other specific note)
INDIVIDUAL LEVEL			
varjobs	dummy	variety of jobs	=1 if individual working in more than one job
SE	dummy	Self-employment	=1 if individual working in the self-employment sector
nonfarm	dummy	nonfarm employment	=1 if individual working in nonfarm activities
hhsector	dummy	household sector employment	=1 if individual working in household sector
hhbusiness	dummy	household business	=1 if individual working in household business sector
hours_SE	numeric	Self-employment working hours	Number of individual working hours in SE sector

⁷ The survey question of the 2010-2014 VHLSS defines the economic types, where it just differentiates whether an individual working for an agricultural household or a non-agricultural household but not know that this individual works for his/her household or another household. While the questionnaire of the 2004-2008 provides information whether an individual works for his/her household or another household but not know that this individual working in an agricultural household or a non-agricultural household. On the other hand, the VHLSSs between 2004 and 2008 distinguish between self-employment in a private enterprise or in a household business but not in the 2002 VHLSS. This is also is discussed in McCaig, B. and N. Pavcnik (2014). Export markets and labor allocation in a low-income country, National Bureau of Economic Research.

hours_nonfarm	numeric	nonfarm working hours	Number of individual working hours in nonfarm sector
hours_hhsector	numeric	hhsector working hours	Number of individual working hours in hhsector sector
hours_hhbusiness	numeric	hhbusiness working hours	Number of individual working hours in hhbusiness sector
age	Numeric	Age of individual	Age of individual
schoolyears	numeric	Years of schooling	Individual years of schooling
HOUSEHOLD LEVEL			
varjobs	numeric	variety of jobs	Number of household members working more than one job
SE	numeric	Self-employment	Number of household members working in the self-employment sector
nonfarm	numeric	nonfarm employment	Number of household members working in nonfarm activities
hhsector	numeric	household sector employment	Number of household members working in household sector
hhbusiness	numeric	household business	Number of household members working in household business sector
hours_SE	numeric	Self-employment working hours	Number of household working hours in SE sector
hours_nonfarm	numeric	nonfarm working hours	Number of household working hours in nonfarm sector
hours_hhsector	numeric	hhsector working hours	Number of household working hours in hhsector sector
hours_hhbusiness	numeric	hhbusiness working hours	Number of household working hours in hhbusiness sector
age_head	Numeric	Age of household head	Age of household head
head_edu	numeric	Education of household head	Years of schooling of household head
hsize	numeric	Household size	The size of household
index_hhdebur	ratio	Household's burden index	The index of household's burden is defined as the number of household's dependent burdens per number of household's working-age adults

III. Summary Statistics

The percentage of individuals involved in many employments within last 12 months increased significantly over the study period from 30.8% in 2002 to 46.2% in 2014. This may be partly due to the available opportunities in the labor market is improved over time. Besides, there is a clear transformation in the employment structure. The proportion of employment in the household sector had decreased by 10 percentage points between 2002 and 2010. Similarly, the proportion of self-employment also decreased to 19.9% in 2014 from 22.8% in 2002. Whereas, in this period the share of employment in the nonfarm and household business sectors increased about 9

and 5 percentage points, respectively. The number of monthly working hours in the nonfarm and household business sectors also increased significantly while those decreased in the household sector.

Table. Descriptive statistics for individuals from 2002 to 2014

Variable	Year	2002	2004	2006	2008	2010	2012	2014
A - Dependent variables								
variety of jobs		30.80%	43.98%	40.59%	40.03%	45.60%	45.48%	46.16%
Self-employment		22.80%	25.04%	24.99%	24.51%	20.82%	20.67%	19.86%
nonfarm employment		35.90%	39.96%	42.12%	43.07%	43.77%	43.96%	44.49%
household sector employment		79.95%	76.62%	75.48%	72.75%	72.32%	71.67%	70.02%
household business		12.56%	12.34%	12.63%	13.20%	23.07%	19.58%	18.04%
Total working hours		128.89	142.94	145.67	142.59	137.26	136.45	136.27
Number of working hours in self-employment sector		34.65	42.30	43.77	42.84	37.60	36.67	35.64
Number of working hours in nonfarm sector		59.25	74.69	80.65	83.00	83.05	82.20	84.48
Number of working hours in household sector		107.89	115.98	117.31	112.49	104.12	102.74	100.41
Number of working hours in household business sector		17.45	21.86	23.82	24.39	44.16	37.66	34.91
B - Establishment status of industrial and economic zone in commune								
-4 or earlier		3.19%	1.97%	1.18%	0.64%	0.22%	0.00%	0.00%
-3		0.13%	0.61%	0.52%	0.16%	0.20%	0.00%	0.00%
-2		0.51%	0.45%	0.24%	0.56%	0.00%	0.22%	0.00%
-1		0.54%	0.27%	0.64%	0.27%	0.02%	0.17%	0.00%
0		0.00%	0.30%	0.47%	0.16%	0.56%	0.00%	0.22%
+1		0.00%	0.42%	0.29%	0.80%	0.24%	0.02%	0.17%
+2		0.00%	0.00%	0.36%	0.27%	1.25%	0.53%	0.00%
+3		0.00%	0.00%	0.47%	0.59%	0.81%	0.27%	0.02%
+4 or later		0.92%	0.72%	0.71%	0.99%	2.18%	4.27%	5.06%
C - Control variables								
Age of individual		38.49	39.20	39.63	40.11	39.59	40.25	40.71
Years of schooling		7.22	7.83	8.06	8.42	8.19	8.34	8.55
Age of household head		47.02	48.39	49.28	50.38	47.72	49.00	50.06
Education of household head		6.95	7.38	7.55	7.79	7.81	7.82	7.94
Household size		5.00	4.84	4.75	4.64	4.48	4.47	4.42
Household's burden index		0.64	0.60	0.53	0.50	0.51	0.49	0.49

The household data shows the same propensity. On average, the monthly working hours in the household employment sector have reduced about 12 hours since 2002, while the number of household's working hours in the nonfarm and household business sectors have grown about 1.5

and 2 times, respectively. The absolute different figures of household working hours are 67 for the nonfarm sector and 43 for the household business sector.

Table. Descriptive statistics for households from 2002 to 2014

Variable	Year	2002	2004	2006	2008	2010	2012	2014
A - Dependent variables								
Number of household members working more than one job		0.73	1.04	1.00	0.99	1.09	1.10	1.13
Number of household members working in the self-employment sector		0.54	0.60	0.61	0.61	0.50	0.50	0.49
Number of household members working in nonfarm activities		0.88	0.99	1.06	1.09	1.08	1.11	1.12
Number of household members working in household sector		1.92	1.85	1.86	1.82	1.74	1.75	1.71
Number of household members working in household business sector		0.32	0.31	0.32	0.33	0.56	0.48	0.45
Total household working hours		311.36	349.05	362.90	360.30	334.91	340.94	339.29
Number of household working hours in self-employment sector		82.44	102.17	107.31	106.07	90.11	88.43	87.59
Number of household working hours in nonfarm sector		146.35	185.56	202.95	211.39	205.55	208.92	213.77
Number of household working hours in household sector		259.04	280.87	289.56	280.58	251.17	251.15	246.72
Number of household working hours in household business sector		45.04	54.92	59.64	61.77	107.31	92.34	87.85
B - Establishment status of industrial and economic zone in commune								
-4 or earlier		3.23%	2.07%	1.19%	0.70%	0.17%	0.00%	0.00%
-3		0.17%	0.62%	0.56%	0.13%	0.17%	0.00%	0.00%
-2		0.51%	0.46%	0.28%	0.51%	0.00%	0.17%	0.00%
-1		0.68%	0.37%	0.62%	0.32%	0.06%	0.17%	0.00%
0		0.06%	0.37%	0.47%	0.13%	0.50%	0.00%	0.17%
+1		0.00%	0.46%	0.37%	0.70%	0.28%	0.06%	0.17%
+2		0.00%	0.03%	0.37%	0.26%	1.11%	0.50%	0.00%
+3		0.00%	0.00%	0.47%	0.58%	0.83%	0.28%	0.06%
+4 or later		0.74%	0.65%	0.66%	0.89%	2.11%	3.91%	4.72%
C - Control variables								
Age of household head		46.71	48.05	49.00	50.13	47.36	48.70	49.85
Education of household head		6.90	7.34	7.46	7.71	7.72	7.76	7.81
Household size		4.66	4.52	4.43	4.31	4.15	4.13	4.04
Household's burden index		0.73	0.68	0.62	0.58	0.58	0.56	0.55

The average age of individuals and household heads in the labor market has increased about two and three years since 2002. The educational attainment of individual and household head has improved about one year of schooling over the last decade. Furthermore, the index of household's burden and the size of household show a same diminishing trend over the study period.

Table. Summary of descriptive Statistics for overall sample at the individual's level

Variable	Obs	Mean	Std. Dev.	Min	Max
A - Dependent variables					
variety of jobs	34,858	0.419732	0.493522	0	1
Self-employment	34,858	0.230908	0.42142	0	1
nonfarm employment	34,858	0.417609	0.493172	0	1
household sector employment	34,858	0.744592	0.436096	0	1
household business	34,858	0.153136	0.360123	0	1
Number of working hours in self-employment sector	34,858	39.80662	80.56161	0	522
Number of working hours in nonfarm sector	34,858	78.16248	99.97077	0	522
Number of working hours in household sector	34,858	110.1728	86.69739	0	522
Number of working hours in household business sector	34,858	28.09557	70.75629	0	522
B - Establishment status of industrial and economic zone in commune					
-4 or earlier	34,858	0.011217	0.105316	0	1
-3	34,858	0.002955	0.054279	0	1
-2	34,858	0.002898	0.053751	0	1
-1	34,858	0.00307	0.05532	0	1
0	34,858	0.002725	0.052134	0	1
+1	34,858	0.002898	0.053751	0	1
+2	34,858	0.003156	0.056087	0	1
+3	34,858	0.002926	0.054016	0	1
+4 or later	34,858	0.018762	0.135685	0	1
C - Control variables					
Age of individual	34,858	39.66016	11.86147	20	64
Years of schooling	34,858	8.060345	4.158861	0	22
Age of household head	34,858	48.83364	11.69425	15	97
Education of household head	34,858	7.581201	4.062664	0	22
Household size	34,858	4.680217	1.683684	1	20
Household's burden index	34,858	0.542542	0.558112	0	5

Table. Summary of descriptive Statistics for overall sample at the household's level

Variable	Obs	Mean	Std. Dev.	Min	Max
A - Dependent variables					

Number of household members working more than one job	15,116	1.011445	0.996422	0	7
Number of household members working in the self-employment sector	15,116	0.559275	0.835845	0	10
Number of household members working in nonfarm activities	15,116	1.043993	1.077535	0	10
Number of household members working in household sector	15,116	1.817081	1.03467	0	10
Number of household members working in household business sector	15,116	0.380722	0.714758	0	6
Number of household working hours in self-employment sector	15,116	96.60501	159.0618	0	1440
Number of household working hours in nonfarm sector	15,116	195.7681	216.9667	0	1761
Number of household working hours in household sector	15,116	269.1131	187.0333	0	1612
Number of household working hours in household business sector	15,116	69.96856	139.4219	0	1440
B - Establishment status of industrial and economic zone in commune					
-4 or earlier	15,116	0.011643	0.107278	0	1
-3	15,116	0.003043	0.055082	0	1
-2	15,116	0.002911	0.053875	0	1
-1	15,116	0.003506	0.059111	0	1
0	15,116	0.002779	0.05264	0	1
+1	15,116	0.003109	0.055676	0	1
+2	15,116	0.003043	0.055082	0	1
+3	15,116	0.002977	0.054482	0	1
+4 or later	15,116	0.0172	0.130022	0	1
C - Control variables					
Age of household head	15,116	48.51277	12.64301	15	97
Education of household head	15,116	7.502894	4.086869	0	22
Household size	15,116	4.350026	1.596784	1	20
Household's burden index	15,116	0.621214	0.615404	0	5

IV. Econometric Equation: Differences in Differences Fixed Effect

a) We run a difference in differences approach with either household or individual fixed effects.

$$Y_{it} = \alpha_i + year_t + \left(\sum_{k=-4, k \neq 1}^4 D_{it}^k \delta_k \right) + X_{jit} \beta + \epsilon_{it}$$

α_i is household or individual i fixed effects. Running a fixed effect regression is to control for time-invariant unobservable characteristics that differ across different households or individuals.

$year_t$ are year indicators that equal 1 if the period is in year t and 0 otherwise. Again, we have household surveys data in 2002, 2004, 2006, 2008, 2010, 2012, and 2014.

D_{it}^k with $k = -4, -3, -2, 0, 1, 2, 3, 4$ are indicators that represent the status of industrial zone. Particularly, δ_k is the effect of being an industrial zone on different economic outcomes k years following the establishment. The variables are defined as followings:

$D_{it}^{-4} = 1$ if the household or individuals is industrial zone/economic zone commune and ≥ 4 years before the zone was established. It equals 0 if the individual or household in a commune that is an industrial zone but less than 4 years before establishment, OR the commune is not an industrial zone at all.

$D_{it}^{-3} = 1$ if the household or individuals is industrial zone/economic zone commune and 3 years before the zone was established. It equals 0 if the individual or household in a commune that is an industrial zone but not 3 years before establishment, OR the commune is not an industrial zone at all.

$D_{it}^{-2}, D_{it}^0, D_{it}^1, D_{it}^2, D_{it}^3$ have similar explanations to D_{it}^{-3} .

$D_{it}^4 = 1$ if the household or individuals is industrial zone/economic zone commune and ≥ 4 years after the zone was established. It equals 0 if the individual or household in a commune that is an industrial zone but less than 4 years before establishment, OR the commune is not an industrial zone at all.

Note that: D_{it}^{-1} is omitted because I choose my base year to be 1 year prior to the establishment of the zone in Event Studies results. X_{jit} is time-variant observable control variables at the household or individual level. Standard errors are clustered at the commune level. In the Main Regression results, base years are any year before the zone's establishment.

V. Regression Results

1) Event Studies

Figure 1 and 2 show that before the industrial and economic zones were established, treatment and control households and individuals generally follow similar trends. The figures also show that at the household level, number of people in the household having two or more jobs increases. Additionally, hours of working in household business or sector increased. This could be that the industrial zone and economic zone bring more diversified job portfolio for the households.

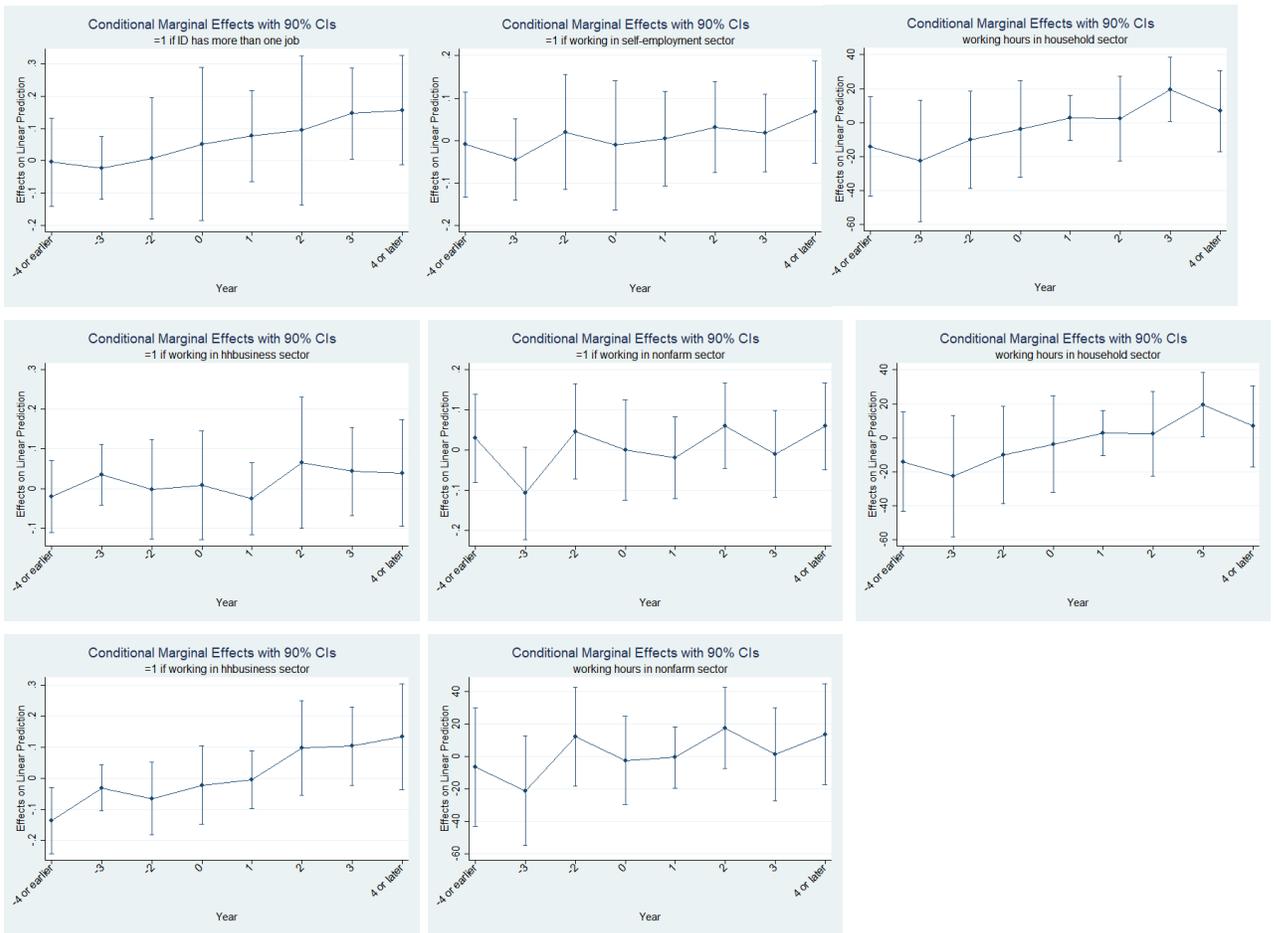


Figure 1. Marginal effects of industrial and economic zone establishment on household employment

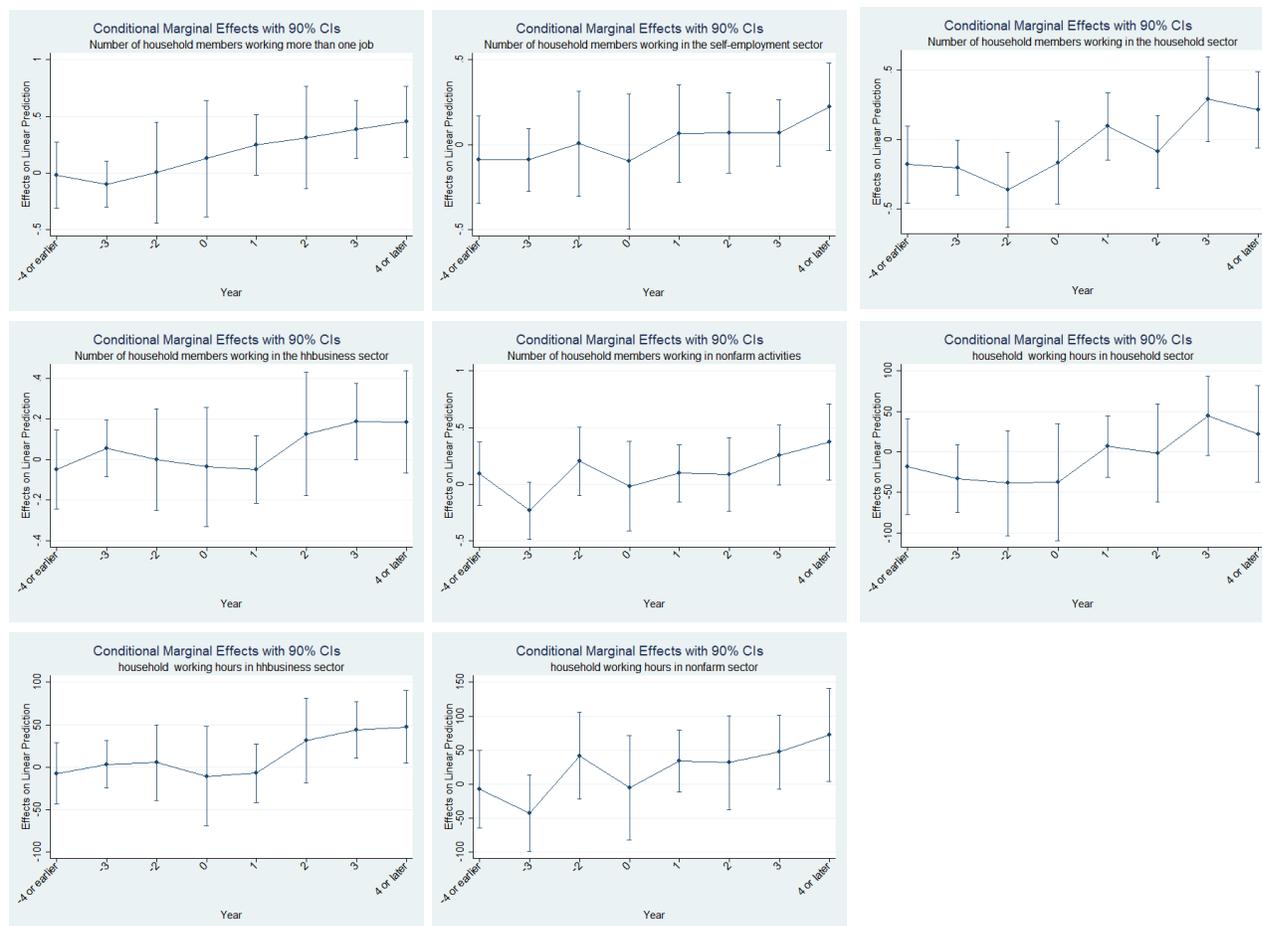


Figure 2. Marginal effects of industrial and economic zone establishment on individual employment

2) Main Regressions

From the main regressions at the individual and household level, we find that at the household level, households in the zones have more members working more than one job, more members working in the household sector, and longer hours working in household sector or household business three or four years after the zone was established. However, the results are not as strong when we look at the individual panel fixed effect.

HOUSEHOLD LEVEL

TRIPLE HOUSEHOLD PANELS (three-wave panels: VHLSS 2002-04-06 & 2004-06-08 & 2010-12-14): sampling individuals in the age of 20-64								
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	varjobs	nonfarm	SE	hbusiness	hhsector	hours_nonfarm	hours_hbusiness	hours_hhsector
INDUSTRIAL AND ECONOMIC ZONE STATUS								
Base year								
Year change	0.132 (0.177)	-0.145 (0.213)	-0.085 (0.162)	-0.031 (0.103)	0.082 (0.124)	-27.460 (31.608)	-12.928 (23.059)	-10.366 (26.773)
1 year later	0.272* (0.150)	0.128 (0.189)	0.088 (0.166)	-0.063 (0.098)	0.187 (0.141)	40.164 (32.030)	-8.571 (22.814)	19.238 (23.655)

2 year later	0.319 (0.271)	-0.001 (0.198)	0.078 (0.148)	0.127 (0.136)	0.110 (0.119)	14.740 (39.367)	29.142 (29.593)	20.287 (27.771)
3 year later	0.397** (0.154)	0.241 (0.183)	0.082 (0.123)	0.182* (0.105)	0.399** (0.185)	44.538 (34.335)	42.463* (21.711)	57.786* (30.283)
4 or more year later	0.462** (0.191)	0.321# (0.211)	0.235 (0.167)	0.183# (0.126)	0.376** (0.148)	62.394[§] (39.105)	45.681* (24.749)	40.666 (32.618)
Constant	0.350** (0.149)	-0.072 (0.139)	0.220* (0.130)	-0.031 (0.114)	0.410*** (0.140)	-33.774 (28.294)	-18.612 (21.127)	46.508* (25.920)
Observations	15,116	15,116	15,116	15,116	15,116	15,116	15,116	15,116
R-squared	0.725	0.825	0.798	0.719	0.834	0.820	0.718	0.757
Household FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: Cluster standard errors at the commune level are in parentheses; and *** p<0.01, ** p<0.05, * p<0.1, [§] p<0.11, # p<0.15. Base years are any year before the zone's establishment.

INDIVIDUAL LEVEL

TRIPLE PANELS (three-wave panels: VHLSS 2002-04-06 & 2004-06-08 & 2010-12-14): sampling individuals in the age of 20-64								
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	varjobs	nonfarm	SE	hhbusine ss	hhsector	hours_nonf arm	hours_hhb usiness	hours_hhse ctor
INDUSTRIAL AND ECONOMIC ZONE STATUS								
Base year	One year before the zone was established or earlier							
Year change	0.049 (0.088)	-0.028 (0.065)	-0.020 (0.059)	0.012 (0.038)	0.051 (0.036)	-4.034 (11.313)	2.584 (7.033)	5.665 (9.068)
1 year later	0.082 (0.075)	0.004 (0.077)	0.015 (0.063)	-0.034 (0.047)	0.064[§] (0.040)	4.402 (14.147)	-4.895 (10.691)	10.393 (10.434)
2 year later	0.093 (0.126)	0.043 (0.057)	0.025 (0.057)	0.066 (0.067)	0.030 (0.041)	12.425 (11.225)	14.210 (11.250)	10.083 (11.121)
3 year later	0.148* (0.077)	-0.006 (0.074)	0.019 (0.056)	0.039 (0.056)	0.099# (0.064)	1.410 (16.089)	13.542 (10.648)	26.120** (11.924)
4 or more year later	0.156* (0.091)	0.050 (0.066)	0.064 (0.072)	0.038 (0.057)	0.095** (0.044)	10.735 (12.922)	13.179 (10.686)	14.479 (12.384)
Constant	0.478*** (0.088)	0.394*** (0.081)	0.179** (0.082)	0.212*** (0.069)	0.671*** (0.083)	74.325*** (16.028)	39.548*** (12.991)	104.237*** (17.266)
Observations	34,858	34,858	34,858	34,858	34,858	34,858	34,858	34,858
R-squared	0.694	0.780	0.768	0.698	0.787	0.778	0.697	0.717
Individual FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: Cluster standard errors at the commune level are in parentheses; and *** p<0.01, ** p<0.05, * p<0.1, [§] p<0.11, # p<0.15. Base years are any year before the zone's establishment.

VI. Conclusions

This paper examines how industrial and economic zones affect labor market structure in Vietnam. We find that, after three years of the zones' establishment, households located in the zones have 40% more family members working for more than one job. Hours of working in the household sector in the zones also increase by 40%. In addition, we do not find evidence for changes in total working hours in a household, suggesting that that formal employment may not increase.

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