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Does Firm Agglomeration Induce Migration? Evidence from Vietnam

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Abstract

This study examines whether the geographical agglomeration of firms affects inter-province migration in Vietnam. We measure firm agglomeration by per capita firm outputs at the province level. We find that the agglomeration of private firms but not stated-owned enterprises and FDI firms has a significant effect on inter-province migration. A one percent increase in private-firm revenue per capita of original provinces reduces the number of out-migrants by 0.075 percent, while a one percent increase in the private-firm revenue per capita of destination provinces increases the number of in-migrants by 0.064 percent. Interestingly, we find a stronger effect of the firm agglomeration on highly-educated people than lowly-educated ones.

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1. Introduction

The most important motive for migration is to find better employment and higher income (Stark and Bloom, 1985; Molloy, 2011). As a result, people tend to move from low-income areas to high-income ones (Stark and Bloom 1985; Stark and Taylor 1991). In this study, we examine to what extent the geographic agglomeration of firms induces inter-province migration in Vietnam using a gravity model. We use rich data sets from firm and population censuses to explore not only the push effect but also the pull effect firm agglomeration on inter-province migration.

Agglomeration of firms in a geographic area can increase economic growth of the area, therefore creating more employment opportunity and attracting migrants. When firms are located near to each other, transaction and transportation costs in buying inputs and selling outputs incurred per unit of distance can be reduced (e.g., Bartelsman et al., 1999; Holmes, 1999). Greater concentration of firms in an area can stimulate the flow of knowledge and ideas between firms and employees (e.g., Almeida and Kohut, 1999; Fallick et al., 2006). Agglomeration can result in productivity and offer a large supply of labor. The concentration of high-skilled migration can be explained by agglomeration economies, and the agglomeration of firms can contribute to this process (Kerr et al. 2016; 2017).

The effect of economic levels on international migration has been studied in a large number of studies. However, there are few studies which investigate the effect of structure of the economy on the migration flow. Several studies, for example Pradhan et al. (2008) and Török (2014) find that economic transformations and re-structure can affect the migration flow by increasing economic growth. To our knowledge, there is little evidence on the effect of firm agglomeration on migration, especially migration within a country.[1] In this study, we look at the push and pull effects of the geographical agglomeration of firms on inter-province migration in Vietnam. The effect is disaggregated for firms with different types including State-owned enterprises (SOEs), foreign direct investment (FDI) firms, private firms, and firms with different labor size. We also look at the effect of firm agglomeration on the flow of migration of people with different education levels. By providing these empirical findings, we expect to make a contribution to the literature of migration.

The paper is organized into five sections. The second section describes the datasets and presents descriptive analysis of firm agglomeration and migration in Vietnam. The third and fourth sections present the estimation method and the empirical results, respectively. Finally, the fifth section concludes the paper.

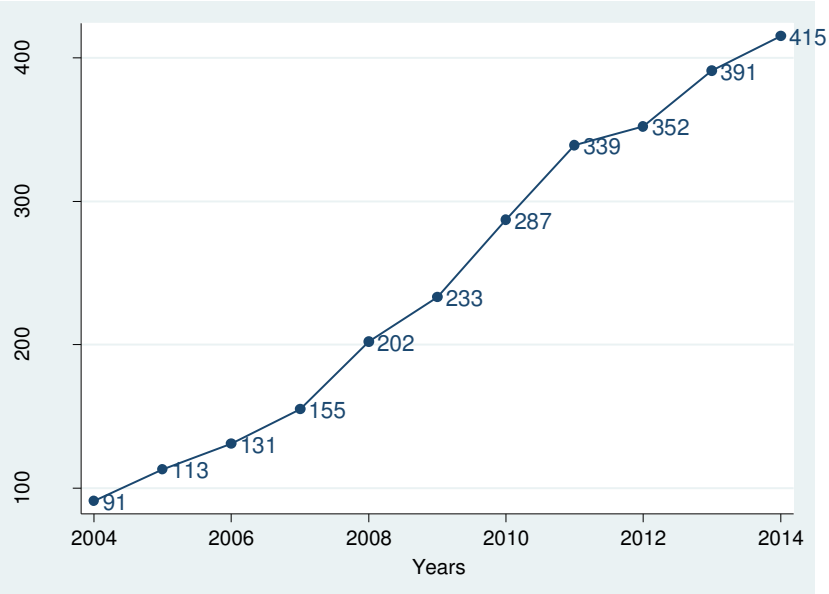
2. Data and descriptive analysis

This study employs two data sets. The first is the Vietnam Enterprise Censuses (VEC) during the 2004-2014 period to measure the geographical agglomeration of firms. These data sets have been conducted annually since 2000 by the General Statistical Office of

[1] There are several studies which look at the effect of foreign direct investment (FDI) on cross-country migration. For example, Aroca and Maloney (2005) find that doubling FDI from the US into Mexico decreases total migration from Mexico to the US by 1.5 to 2 per cent. Wang et al. (2013) find that a one percent increase in FDI (measured by as a share of GDP) from country i to country j reduces the migration of individuals with tertiary education from country j to country i by 0.2 percent.

Vietnam (GSO). We use the VECs from 2004 to 2014 since the migration data are available during this period. VECs provide information on firm performances of all firms registered in Vietnam. Figure 1 shows that the number of firms increased from around 91 thousand in 2004 to 415 thousand in 2014.

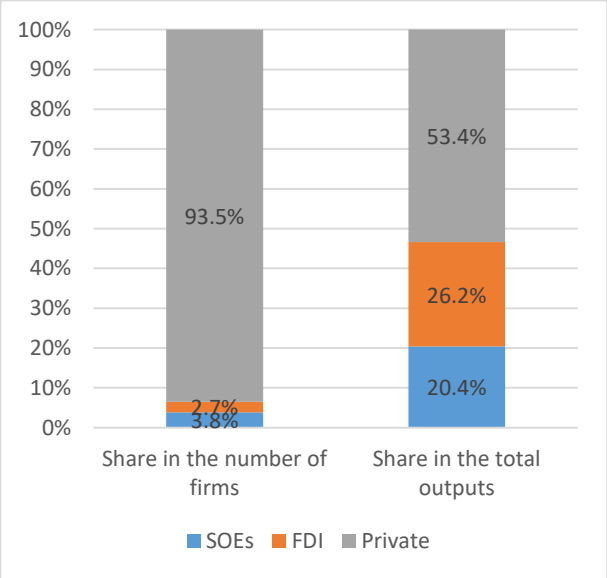
Figure 1. The number of firms in Vietnam



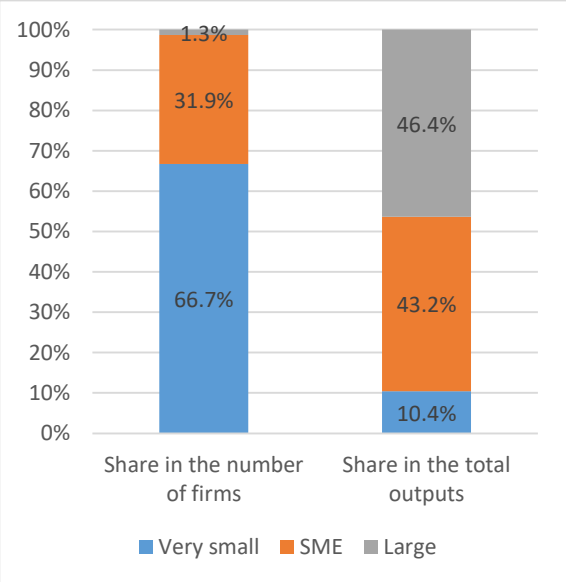
Sources: estimation from VECs.

Figure 2: Share of firm numbers and outputs by ownership and labor size in 2014

Panel A. Share of ownership



Panel B. Share by labor size



Sources: estimation from VECs.

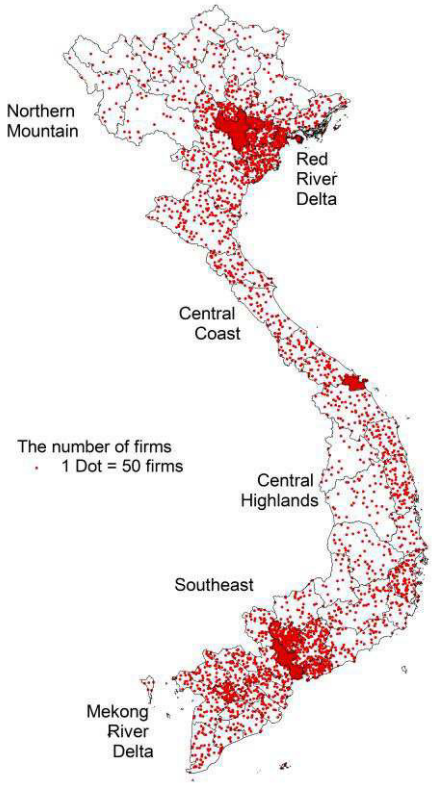
Panel A of Figure 2 presents the share of firms and the share of their revenues by firm types in 2014. Although SOEs and FDI firms accounted for 3.8% and 2.7% in the total number of firms, they accounted for 20.4% and 26.2% of the total revenue of all the firms, respectively. We also classify firms into very small ones with less than 10

employees, small and medium enterprise (SME) with 10 to less than 300 employees, and large firms with at least 300 employees. Panel B of Figure 2 shows that the share of large firms by number was only 1.3% while it was 46.4% of the total revenue. On the other hand, the very small firms accounted for two-thirds of the number of firms but constituted a small share by the total revenue.

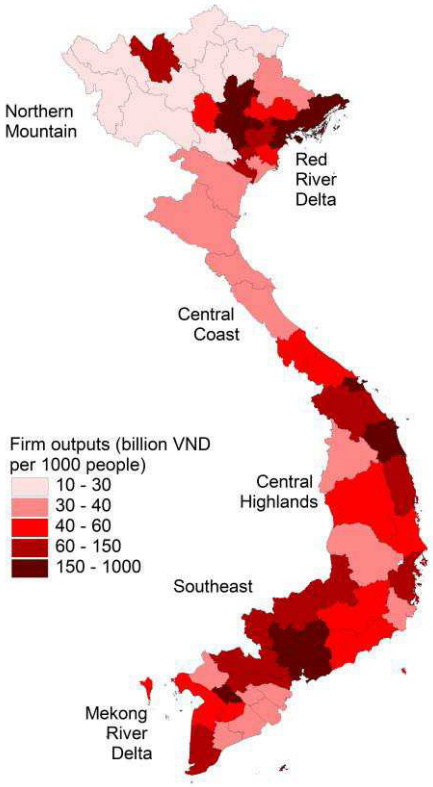
Firm agglomeration is often measured by the relative density of firms by industrial sectors within an area (e.g., Ellison and Glaeser 1997, 1999). In this study, the geographical agglomeration of firms is measured by the total revenue of firms at the provincial level divided by population. The firm revenue is more related to local employment and output. Figure 3 presents the geographical distribution of firms and the firm output per capita by provinces.

Figure 3. The number of firms and firm revenue in 2014

Panel A. Geographical location of firms



Panel B. Firm revenue (billion VND per 1000 people)



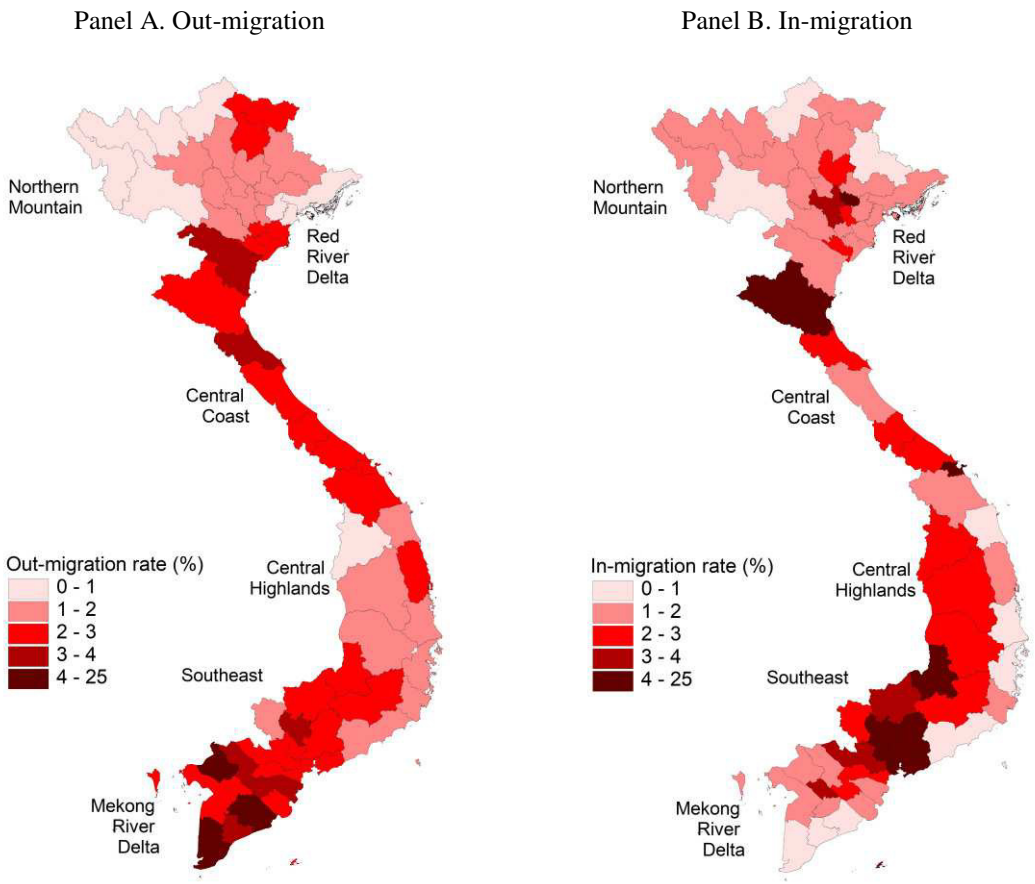
Source: Estimation from the 2014 VEC.

The second data set is the 2009 Population and Housing Census (VPHC) and the 2014 Vietnam Intercensal Population and Housing Survey (IPHS). The data were also conducted by GSO to collect data on basic demographic and housing characteristics of people in Vietnam. These data sets contain information on inter-province migration by asking which province individuals lived in during the 5 years prior to the census.[2] This migration is defined as the mobility of individuals across provinces over the past 5 years. The percentage of inter-province migration in 2009 and 2014 was 4.3% and 3.2%,

[2] The dataset contains no information on migration over varying time periods, such as 1 year or 10 years, so we can only describe migration over the past 5 years in this study.

respectively. Figure 4 shows the percentage of inter-province out-migration and in-migration during the 5 years previous to 2014.

Figure 4. The out-migration and in-migration rates of provinces in 2014



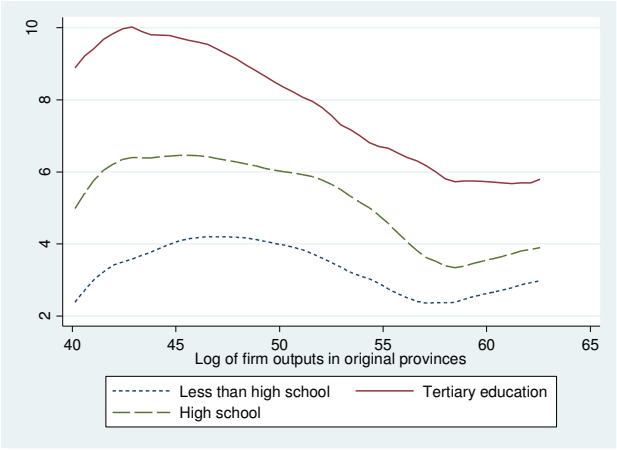
Note: This figure presents inter-province out-migration and in-migration rate (as a percent) in 2014. The in-migration (out-migration) rate of a province is the number of people in-migrating (out-migrating) to the province over the past 5 years as a proportion of the province's total population.
Source: Estimation from the 2014 IPHS.

Figure 5 graphs the in-migration and out-migration rates across the firm agglomeration level. In panel A of this figure, the y-axis presents the rate of out-migration (in percent) of provinces, while the x-axis presents the log of per capita firm outputs of these provinces. We graph the out-migration rate for people with different education levels. Panel A shows that the rate of out-migration from a province tends to decrease as the per capita firm outputs of the province increases. Provinces with higher firm agglomeration tend to have a lower rate of out-migration. Moreover, the out-migration rate is higher for people with higher education.

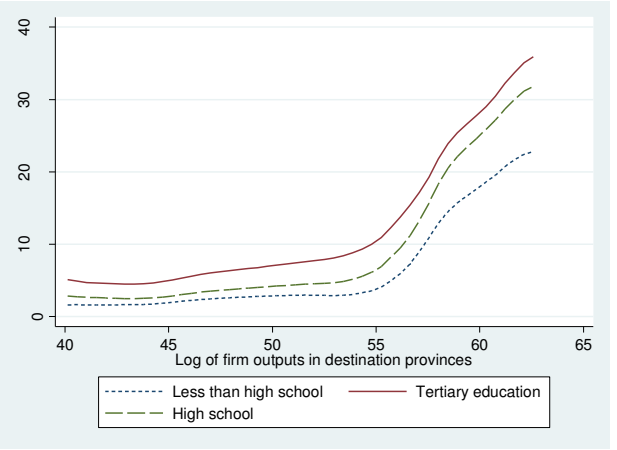
In panel B of Figure 5, the y-axis presents the rate of in-migration (in percent) into provinces, while the x-axis presents the log of per capita firm outputs of these provinces. As the per capita firm outputs of a province increase, the in-migration rate into this province tends to be higher. It means that provinces with higher firm agglomeration attract more in-migrants.

Figure 5. Out-migration and in-migration rates across the per capita firm revenue

Panel A. Out-migration rate by firm outputs in original provinces



Panel B. In-migration rate by firm outputs in destination provinces



Source: Estimation from the 2014 VEC and the 2014 IPHS.

3. Estimation method

We use a gravity model to estimate the effect of firm agglomeration on migration. Gravity models are widely used to estimate the push-pull effects of factors on migration (e.g., Volger & Rotte, 2000; Phan & Coxhead, 2010). The regression form of the gravity regression model can be written as follows:

$$\log(M_{ijt}) = \alpha + \gamma_1 \log(Population_{it}) + \gamma_2 \log(Population_{jt}) + \pi \log(Distance_{ij})$$

$$+\beta_1 Agglomeration_{it} + \beta_2 Agglomeration_{jt} + X'_{it}\theta_1 + X'_{jt}\theta_2 + T_t\delta + u_{ij} + v_{ijt}, \quad (1)$$

where M_{ijt} is the migration flow from province *i* to province *j* in year *t* during the past 5 years; $Population_{it}$ and $Population_{jt}$ are population of provinces *i* and *j* in year *t*, respectively; $Distance_{ij}$ is the distance between the two provinces; $Agglomeration_{it}$ and $Agglomeration_{jt}$ are the variables of firm agglomerations in provinces *i* and *j* in year *t*, respectively. We can control for additional variables *X* and time dummies *T*. u_{ij} and v_{ijt} are time-invariant and time-variant unobserved variables, respectively.

The push effect and pull effect of firm agglomeration are measured by the coefficients β_1 and β_2, respectively. If firm agglomeration attracts migration, people will move from provinces with fewer firms to those with more firms. We expect that $\beta_1 < 0$ and $\beta_2 > 0$.

A problem in estimating equation (1) is the endogeneity of firm agglomeration. There are two sources of endogeneity bias. Firstly, there can be omitted variables that can affect both migration and firm agglomeration. For example, provinces with better governance and public services can attract both migration of people and agglomeration of firms. Secondly, there is a problem of reserve causality. Firms can be re-allocated to areas where there are talented labor pools, suggesting that firms follow people. To address the endogeneity issue, we control for fixed-effects of pairwise origin-destination provinces. In other words, we estimate the over-time change in the agglomeration on the change in the migration flow. The pairwise province fixed-effects regression address

endogeneity bias caused by time-invariant unobserved variables u_{ij}. Although we are seeking evidence of a causal effect of firm agglomeration, we are fully aware of the challenges in estimating the causal effect. Interpretation of causal effects should be cautious in this study. The province fixed-effects regression may still provide biased estimates of the firm agglomeration if the firm agglomeration is correlated with time-variant unobserved variables.

4. Empirical results

Tables 1 and 2 report the effects of firm agglomeration on inter-province migration. Variables such as geographic characteristics and distance between provinces that are time-invariant are eliminated in fixed-effects regressions. It should be noted that control variables should be exogenous and unaffected by the treatment variable of interest, i.e. the firm agglomeration in this case (Angrist and Pischke, 2009; Heckman et al., 1999). We aim to estimate the total effect of the firm agglomeration rather than its partial effect with other variables held constant (Duflo et al., 2008). Thus we tend to use parsimonious models. We control for log of population and log of per capita income of provinces. However per capita income of provinces can be affected the firm agglomeration. Thus we also tried regression models without controlling for per capita income of provinces. The results are very similar. For interpretation, we use the models with controlling for per capita income.

As mentioned, we measure the geographical agglomeration of firms by the total revenue of firms at the provincial level divided by population. For robustness analysis, we also measure the firm agglomeration by the density of firms within a province, i.e., the number of firms within a province divided by the area of the province (measured by km2). Results of regression using the firm density are reported in Tables A.1 and A.2 in Appendix. These results are similar to those in Tables 1 and 2. For interpretation we use the results from regression using per capita firm outputs as the measure of firm agglomeration.

We examine the effect of SOEs, FDI firms and private firms on the flow of overall migrants, and migrants with different education levels.[3] Table 1 shows that there are no significant effects of the agglomeration of SOEs as well as FDI firms on migration. However, people tend to move from provinces with low agglomeration of private firms to those with high agglomeration of private firms. A one percent increase in private-firm revenue per capita of original provinces reduces the number of out-migrants by 0.075 percent, while a one percent increase in the private-firm revenue per capita of destination provinces increases the number of in-migrants by 0.064 percent.

A possible reason for the significant effect of private firms is that private firms account for a higher share of the number firms and total employment. In 2014, workers in the private firms accounted for 61% of the total employment in all the firms. Giang et al. (2015) find that agglomeration of private firms but not SOEs increases employment and income for local people in Vietnam. This finding indicates that private firms attract in-migration through offering more employment opportunities.

We also examine the effect of firm agglomeration on the migration of people with differing education levels. High agglomeration of private firms in source provinces has a

[3] We do not measure the effect on migration of people with different occupation, since there is no information on occupation of migrants before migration.

negative effect on the migration of people with less than high-school education and those with tertiary education but not people with high-school education. In destination provinces, agglomeration of private firms has a positive (pull) effect on the migration of people with high-school education and those with tertiary education. The pull effect of the agglomeration of private firms is highest for people with tertiary education. It is consistent with an influential view that more highly educated individuals have better information and employment opportunities, and they more likely to migrate than people with low education (e.g., Levy & Wadycki, 1974; Faggian et al. 2007). Our finding is also consistent with the observation on the geographical concentration of high-skilled migrants (Kerr et al. 2016; 2017).

Table 1. Regression of inter-province migration on per capita revenue of SOEs, FDI, and private firms

Explanatory variables	Dependent variables			
	Log of migration flow	Log of migration of people without high school education	Log of migration of people with high school education	Log of migration of people with tertiary education
	(1)	(2)	(3)	(4)
Log of revenue of SOEs in original provinces	0.0033	0.0101	-0.0066	-0.0270**
	(0.0145)	(0.0176)	(0.0136)	(0.0132)
Log of revenue of FDI firms in original provinces	0.0036	0.0117	0.0055	-0.0008
	(0.0046)	(0.0076)	(0.0043)	(0.0041)
Log of revenue of private firms in original provinces	-0.0753***	-0.1613***	-0.0047	-0.0412**
	(0.0233)	(0.0305)	(0.0218)	(0.0207)
Log of revenue of SOEs in destination provinces	0.0124	0.0309	0.0099	0.0057
	(0.0150)	(0.0252)	(0.0132)	(0.0122)
Log of revenue of FDI firms in destination provinces	0.0054	0.0048	0.0001	0.0051
	(0.0043)	(0.0069)	(0.0041)	(0.0036)
Log of revenue of private firms in destination provinces	0.0639***	0.0243	0.0490**	0.1442***
	(0.0223)	(0.0334)	(0.0214)	(0.0205)
Log of per capita income of original provinces	-0.4180	0.2996	0.1792	-0.2839
	(0.3403)	(0.4201)	(0.3101)	(0.2924)
Log of per capita income of destination provinces	-0.3790	-0.3527	-0.2549	-0.0226
	(0.3327)	(0.4699)	(0.3236)	(0.3034)
Log of population of original provinces	4.5334***	4.5394***	5.2000***	3.7749***
	(0.8140)	(1.2801)	(0.7860)	(0.7157)
Log of population of destination provinces	1.3297*	1.0096	-2.7239***	-2.2064***
	(0.7356)	(1.0066)	(0.7503)	(0.7383)
Year 2014	-0.9211***	-1.2819***	-1.2221***	-0.7085***
	(0.2767)	(0.3839)	(0.2638)	(0.2493)
Pairwise province fixed-effects	Yes	Yes	Yes	Yes
Constant	-69.766***	-68.496***	-33.319**	-21.023
	(15.707)	(23.003)	(15.491)	(14.679)
Observations	7,812	7,812	7,812	7,812
R-squared	0.880	0.777	0.850	0.843

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2 reports the effect of the agglomeration of firms with different labor sizes. While the agglomeration of SMEs and large firms do not have significant effects on the

flow of overall migration, the agglomeration of very small firms has significant pull effects as well as push-effects on migration. This finding is consistent with the finding on the significant effect on migration of private firms instead of SOEs and FDI firms. Private firms have much smaller size than SOEs and FDI firms. The agglomeration of small as well as large firms in the destination province have a positive effect on in-migration of people with tertiary education. A one percent increase in the per capita revenue of very small firms and SMEs increases the number of migrants with tertiary education by 0.055 percent and 0.086 percent, respectively. The elasticity of migration of people with tertiary education with respect to the agglomeration of large firms is lower, at 0.029.

Table 2. Regression of inter-province migration on revenue of very small, SME, and large firms

Explanatory variables	Dependent variables			
	Log of migration flow	Log of migration of people without high school education	Log of migration of people with high school education	Log of migration of people with tertiary education
	(1)	(2)	(3)	(4)
Log of revenue of very small firms in original provinces	-0.0816***	-0.0924***	-0.0195	-0.0197
	(0.0190)	(0.0347)	(0.0176)	(0.0168)
Log of revenue of SMEs in original provinces	0.0227	0.0017	-0.0510*	0.0107
	(0.0329)	(0.0512)	(0.0304)	(0.0279)
Log of revenue of large firms in original provinces	-0.0120	0.0012	0.0203	-0.0247*
	(0.0146)	(0.0199)	(0.0137)	(0.0129)
Log of revenue of very small firms in destination provinces	0.0332*	0.0087	0.0409**	0.0551***
	(0.0188)	(0.0270)	(0.0175)	(0.0165)
Log of revenue of SMEs in destination provinces	0.0439	0.0568	-0.0011	0.0860***
	(0.0307)	(0.0464)	(0.0306)	(0.0288)
Log of revenue of large firms in destination provinces	0.0173	0.0297	0.0236*	0.0292**
	(0.0145)	(0.0214)	(0.0133)	(0.0121)
Log of per capita income of original provinces	-0.5571	0.1740	0.2673	-0.3987
	(0.3436)	(0.4341)	(0.3185)	(0.2993)
Log of per capita income of destination provinces	-0.3616	-0.3653	-0.1690	-0.0241
	(0.3390)	(0.4824)	(0.3285)	(0.3114)
Log of population of original provinces	5.0916***	4.5740***	4.3090***	4.3402***
	(0.8767)	(1.4296)	(0.8452)	(0.7740)
Log of population of destination provinces	1.1899	1.2961	-3.0645***	-2.1900***
	(0.7683)	(1.0796)	(0.7980)	(0.7849)
Year 2014	-0.9524***	-1.5896***	-1.1298***	-0.8025***
	(0.2811)	(0.3956)	(0.2675)	(0.2482)
Pairwise province fixed-effects	Yes	Yes	Yes	Yes
Constant	-75.4274***	-76.8623***	-16.2898	-30.1001**
	(16.6523)	(24.9723)	(16.5443)	(15.2913)
Observations	7,812	7,812	7,812	7,812
R-squared	0.881	0.777	0.851	0.844

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5. Conclusions

Vietnam is a country with relatively high internal migration from rural to urban areas (Coxhead et al., 2015). In this study, we find that the agglomeration of firms is one of factors inducing migration. People tend to move to provinces with more agglomeration of firms, especially private firms and those with small sizes. Non-farm employment from firms is an important motive for migration. We do not find significant effects of SOEs and FDI firms on migration. SOEs and FDI firms are capital intensive, and finding a job in these firms is not easy, especially for migrants. Our finding suggests the important role of the private sector and small firms in creating jobs and improving human capital through migration.

References

Almeida, P. and Kogut, B., (1999) "Localization of Knowledge and The Mobility of Engineers in Regional Networks" *Management Science* 45(7), 905–17.

Angrist, J. D. and Pischke, J. (2009) *Mostly Harmless Econometrics: An Empiricist's Companion*. New Jersey: Princeton University Press.

Aroca, P. and W. F. Maloney (2005) "Migration, Trade and Foreign Direct Investment in Mexico" *World Bank Economic Review* 19(3), 449–72.

Bartelsman, E.J., Caballero, R.J. and Lyons, R.K., (1994) "Customer-and Supplier-driven Externalities" *The American Economic Review* 84(4), 1075–84.

Coxhead, I., Cuong, N. V., & Vu, L. H. (2015) "Migration in Vietnam: New Evidence from Recent Surveys" *World Bank: Vietnam Development Economics Discussion Papers*, No. 2., World Bank, Hanoi, Vietnam.

Duflo, E., Glennerster, R., & Kremer, M. (2007) "Using Randomization in Development Economics Research: A Toolkit" *Handbook of Development Economics* 4, 3895-3962.

Ellison, G., & Glaeser, E. (1997) "Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach" *Journal of Political Economy* 105(5), 889–927.

Ellison, G., and Glaeser, E. (1999) "The Geographic Concentration of Industry: Does Natural Advantage Explain Agglomeration?" *American Economic Review* 89, 311-316.

Faggian, A., McCann, P. & Sheppard, S. (2007) "Human Capital, Higher Education and Graduate Migration: An Analysis of Scottish and Welsh Students" *Urban Studies* 44(13), 2511–2528.

Fallick, B., Fleischman, C.A. and Rebitzer, J.B., (2006) "Job-Hopping in Silicon Valley: Some Evidence Concerning the Microfoundations of a Hightechnology Cluster" *The Review of Economics and Statistics* 88(3), 472–81.

Giang, L. T., Nguyen, C. V., & Nguyen, H. Q. (2020) "The Impacts of Economic Growth and Governance on Migration: Evidence from Vietnam" *The European Journal of Development Research*, 1-35.

Giang, L. T., Nguyen, C. V., Van, H. V., & Vu, T. (2015) "Does Firm Privatisation Benefit Local Households? The Case of Vietnam" *Post-Communist Economies 27*(4), 547-565.

Heckman, J., LaLonde, Robert, J; and Smith Jeffrey A. (1999) "The Economics and Econometrics of Active Labor Market Programs". In *Handbook of Labor Economics* 1999; volume 3, edited by Ashenfelter, A. and D. Card. Elsevier Science.

Holmes, T.J., (1999) "Localization of Industry and Vertical Disintegration" *Review of Economics and Statistics* 81(2), 314–25.

Kerr, S. P., Kerr, W., Özden, Ç., & Parsons, C. (2016) "Global Talent Flows" *Journal of Economic Perspectives* 30(4), 83-106.

Kerr, S. P., Kerr, W., Özden, Ç., & Parsons, C. (2017) "High-Skilled Migration and Agglomeration" *Annual Review of Economics* 9, 201-234.

Levy, M. B., & Wadycki, W. J. (1974). "Education and the Decision to Migrate: An Econometric Analysis of Migration in Venezuela" *Econometrica* 42(2), 377–388.

Molloy, R., Smith, C.L. & Wozniak, A. (2011) “Internal Migration in the United States” *The Journal of Economic Perspectives* 25(3), 173-196.

Phan, D. & Coxhead, I. (2010) “Interprovincial Migration and Inequality during Vietnam’s Transition” *Journal of Development Economics* 91(1), 100–112.

Pradhan, G., M. Upadhyay, and K. Upadhyaya. (2008) “Remittances and Economic Growth in Developing Countries” *The European Journal of Development Research* 20 (3), 497–506.

Stark, O. & D. Bloom (1985) “The New Economics of Labor Migration” *American Economic Review* 75(2), 173–178.

Stark, O., and J. Taylor (1991) “Migration Incentives, Migration Types: The Role of Relative Deprivation” *The Economic Journal* 101(2), 1163–1178.

Török, I. (2014) “From Growth to Shrinkage: The Effects of Economic Change on the Migration Processes in Rural Romania” *Applied Agriculture Forestry Research* 64 (3–4): 195–206.

Volger, M., & Rotte, R. (2000) “The Effects of Development on Migration: Theoretical Issues and New Empirical Evidence” *Journal of Population Economics* 13(3), 485–508.

Wang, M., Wong, M. S., & Granato, J. (2013) “The Effect of Foreign Direct Investment on International Migration: Does Education Matter?” *The World Economy 36*(5), 537-562.

Appendix

Table A.1. Regression of inter-province migration on per capita revenue of SOEs, FDI, and private firms

Explanatory variables	Dependent variables			
	Log of migration flow	Log of migration of people without high school education	Log of migration of people with high school education	Log of migration of people with tertiary education
	(1)	(2)	(3)	(4)
Log of revenue of SOEs in original provinces	-0.1675	-0.0524	-0.1138	-0.0828
	(0.1376)	(0.2064)	(0.1256)	(0.1224)
Log of revenue of FDI firms in original provinces	-0.0108	-0.0412	-0.1008*	0.0846
	(0.0627)	(0.0956)	(0.0592)	(0.0549)
Log of revenue of private firms in original provinces	-0.1645	-0.5831***	-0.2075*	-0.3844***
	(0.1329)	(0.2015)	(0.1237)	(0.1153)
Log of revenue of SOEs in destination provinces	-0.0978	0.1741	-0.0338	-0.1094
	(0.1337)	(0.2928)	(0.1250)	(0.1179)
Log of revenue of FDI firms in destination provinces	0.1107	0.1127	-0.0426	0.0089
	(0.0713)	(0.0833)	(0.0593)	(0.0548)
Log of revenue of private firms in destination provinces	0.1360**	0.1166	0.0850	0.3373***
	(0.0640)	(0.1882)	(0.1217)	(0.1133)
Log of per capita income of original provinces	-0.5081	0.3004	0.0719	-0.2330
	(0.3517)	(0.4395)	(0.3236)	(0.3081)
Log of per capita income of destination provinces	-0.2761	0.0648	-0.2796	0.0719
	(0.3490)	(0.4543)	(0.3395)	(0.3219)
Log of population of original provinces	5.3742***	5.8115***	5.3086***	5.4602***
	(0.8816)	(1.5149)	(0.8658)	(0.8152)
Log of population of destination provinces	0.6527	1.5575	-3.3666***	-3.7956***
	(0.8163)	(1.0389)	(0.8157)	(0.8076)
Year 2014	-0.9800***	-1.0837**	-0.7572***	-0.5637**
	(0.2923)	(0.4496)	(0.2749)	(0.2572)
Pairwise province fixed-effects	Yes	Yes	Yes	Yes
Constant	-71.0896***	-96.6920***	-21.0424	-19.2631
	(16.5857)	(25.2919)	(16.3101)	(15.8355)
Observations	7,812	7,812	7,812	7,812
R-squared	0.880	0.776	0.850	0.842

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.2. Regression of inter-province migration on revenue of very small, SME, and large firms

Explanatory variables	Dependent variables			
	Log of migration flow	Log of migration of people without high school education	Log of migration of people with high school education	Log of migration of people with tertiary education
	(1)	(2)	(3)	(4)
Log of revenue of very small firms in original provinces	-0.1543*	-0.2247**	-0.0511	-0.2730***
	(0.0918)	(0.1141)	(0.0842)	(0.0767)
Log of revenue of SMEs in original provinces	0.1058	-0.4591*	-0.4494***	0.0488
	(0.1559)	(0.2611)	(0.1430)	(0.1284)
Log of revenue of large firms in original provinces	-0.1657	-0.0300	0.1334	0.1108
	(0.1126)	(0.1731)	(0.1039)	(0.0982)
Log of revenue of very small firms in destination provinces	0.0566**	-0.2029	0.1427*	0.3401***
	(0.0254)	(0.1234)	(0.0831)	(0.0763)
Log of revenue of SMEs in destination provinces	0.2376	0.0380	-0.1242	-0.1491
	(0.1497)	(0.2190)	(0.1444)	(0.1342)
Log of revenue of large firms in destination provinces	0.2493**	0.1804	0.3360***	0.4510***
	(0.1084)	(0.1538)	(0.1013)	(0.0916)
Log of per capita income of original provinces	-0.4848	0.3644	0.3073	-0.2055
	(0.3438)	(0.4303)	(0.3161)	(0.3029)
Log of per capita income of destination provinces	-0.2409	-0.0267	-0.0693	0.1840
	(0.3416)	(0.4739)	(0.3278)	(0.3111)
Log of population of original provinces	5.1153***	5.5768***	5.5152***	5.0657***
	(0.8141)	(1.2392)	(0.8092)	(0.7451)
Log of population of destination provinces	0.2402	1.0828	-3.1603***	-4.2328***
	(0.7433)	(0.9750)	(0.7540)	(0.7575)
Year 2014	-1.1120***	-1.2041***	-0.8487***	-0.6734***
	(0.3017)	(0.4565)	(0.2815)	(0.2576)
Pairwise province fixed-effects	Yes	Yes	Yes	Yes
Constant	-64.2811***	-88.2086***	-29.9552*	-10.4638
	(15.4911)	(20.6663)	(15.3774)	(14.7653)
Observations	7,812	7,812	7,812	7,812
R-squared	0.880	0.776	0.851	0.843

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1