

The mobility of the triangular hub cities against a cause of workers' transfer(Germany, Poland, Hungary)

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노동자 이동의 원인에 대한 삼각 허브 도시의 유동성(독일, 폴란드, 헝가리)

서대성

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Abstract This paper studies the impact of domestic and foreign economic activity on mobility among regions. The shortage of human resources and demand continues in Eastern Europeans. Especially Ukrainians, have entered the Polish labor market to make up for the scarce areas. As a result, Poland's supply and demand in Ukraine is disproportionate. Minimum wage increases are putting continued pressure on employers. Therefore, the regression equation in the form of job-seeker's economic activity ratio, $y = AX^2 + B$ ($x = \text{settlers}$) can be used to grasp the relationship between curves. According to the domestic and foreign workers who migrated, economic activities was rather than increasing the local population, the settlers of nearby large cities is more proportional. Empirical analysis has shown that the human resource hub has increased migration to large cities and industrial. The hub 'A' nation has been created for mobility in 4th wave re-industry, and the same re-industrialization (N_2) in other cities has attracted nearby human resources, but not settle. After all, the hub relationship between N_1 and N_2 is a mobile relationship. Due to wage inequality or a positive wellbeing chasm, workers are not settled plant area but a nearby city, or commuting between borders is easy to go into the hub central city. However, this proved on emerging from the relatively temporary settlers in the AI era.

Key Words : Mobility, Chasm, Triangular, Spoke-hub, Wellbeing-inequality, Settler

요약 본 논문은 국내외 경제 활동은 지역 간 이동성에 미치는 영향성을 연구한다. 동유럽에서는 인적 자원과 수요가 여전히 부족하다. 특히 우크라이나 인들은 최소 한 지역을 보충하기 위해 폴란드 노동 시장에 진출했다. 결과적으로 우크라이나의 폴란드 수요와 공급은 불균형하다. 최저 임금 인상은 고용주에게 지속적인 압력을 가하고 있다. 따라서 구직자의 경제 활동 비율, $y = AX^2 + B$ ($x = \text{정착}$) 형태의 회귀 방정식을 사용하여 곡선 간의 관계를 파악할 수 있다. 이주한 국내외 노동자에 따르면 경제 활동은 지역 인구를 늘리는 것이 아니라 인근 대도시의 정착민이 더 비례한다. 실증적 분석에 따르면 인적 자원 허브가 대도시 및 산업으로의 이동이 증가한 것으로 나타났다. 허브 A 국가는 4 차 재산업에서 이동성을 위해 만들어졌으며 다른 도시에서와 동일한 재산업화 (N_2)가 인근 인력을 유치했지만 정착하지는 못했다. 결국 N_1 과 N_2 의 허브 관계는 이동 관계이다. 임금 불평등이나 긍정적인 후생 단절로 인해 노동자들은 공장 지역이 아니라 인근 도시에 정착하거나 국경 사이의 통근이 허브 중심 도시로 가기 쉽다. 그러나 이것은 인공지능 시대의 상대적으로 일시적인 정착민들로부터 대두된다.

주제어 : 유동성, 단절, 삼각, 주변-허브, 웰빙-불평등, 정착

1. Introduction

Hub cities have moved or become established in the surrounding cities due to the migration of workers. This is because mobility in the 4th industry is increasing hub cities. The increase in hub cities, between nations, has also been strengthened, and the decline in peripheral cities has weakened the role of the country's capital. The purpose of research is because human welfare and labor market factors affect the mobility on the 4th industry, of which surrounding cities are the increasing tendency to accelerate to become hub cities between cities in Eastern Europe. Externally, trade friction between the United States and China has negatively affected economic growth, including China's heavy dependence on exports, sluggish Germany, and Brexit, as existing economic growth in the EU has slowed. Meanwhile, neighboring Ukraine lost almost 23% of its population after gaining independence as a "leader" in terms of population decline[1,2]. They went into Poland.

But the weak economics of the EaP (Employee Assistance Program) have reduced fertility, increased mortality and reduced life expectancy. Emigration, however is the most important reason for population decline. In the past, people migrated to the Russian Federation in EaP countries, but these trends have changed over the past few years due to the weakening Russian economy and currency devaluation. Immigration patterns have turned mainly to other EU labor markets. Ukraine and Belarus have been spilled to Poland and Moldova have migrated to Italy and Georgians moved to other EU member states. The ideas presented by Poland and Sweden are mostly why the Visegrad Group, and other EU member states, have become so issue for the continued commitment of the best EaP. Humanistic Welfare for human resources will work in the next decade.

This, however, has not solved each

demographic problem in the Eastern Region. Poland has seen unemployment continue to improve on hub cities near neighbours. This seeks to depart from a simple manufacturing base trading strategy and illuminate European hub (industrial) cities against changes in the welfare system and human resources associated with the fourth industrialization. Today, Poland and Hungary are already continually preparing from a global perspective, from traditional manufacturing to 4th wave re-industries.

2. Preliminary research

In terms of hubs for migration, Szeptycki (2016) compared the two countries in terms of France and Germany due to regional size, region and location[3]. The two countries are deeply interested in mutual cooperation. Such a situation is a direct neighbor, a complex general history. Today, economic relationships lead to mutual attraction. This is the attractiveness of the Polish labor market for Ukrainians when compared in Eastern Europe[4,5]. As a member of Poland, the western structure is a trade change with variables such as the threat of Russia. Despite these stakes, it is not easy for the two countries to effectively develop mutual economic cooperation and turn them into substantial strategic partnerships.

Gomułka (2019) mentioned the green island phenomenon depicting Poland[6]. During the period 2001–2004 (IA), Poland's GDP growth was the lowest of the 8 transition countries in Central–North Europe[7]. Between 2001–2015, in some parts of Europe, the leaders in economic growth were Slovakia and Lithuania. In addition, Bulgaria, Latvia and Romania also achieved better results than Poland. The sure exception was Hungary. In relation to the period 2009–2015(II), Poland's most differentiating category was that there was no banking crisis.

The reason was based on the low levels of household and corporate bank lending.

In particular, the "green island" phenomenon during the global financial crisis (2008–2009), the new danger that prevents Poland from technically able to further reduce development, inequality in most developed countries depends on the labor market and public debt, and on an unusually fast liberal transformation. This suggests that the labor market has tightened and wage pressures have intensified inflation. Right here, migration and settlement between cities has increased. The interest in limiting the effects of Europe–China is more urgent than now (the EC calls the PRC a "strategic competitor"). In European dimensions and EU member states both lacked 4th industrial production mechanisms. From these perspectives, the slowdown in China's economy has convulsed its global impact. These competitions are increasing the hub for mobility and shared industries in urban regeneration.

With Szeptycki (2016)'s way, Polish wages were higher than Ukraine, they moved to Poland, which is linguistically relatively similar in communication and culture. in 2019, on the 30th anniversary of the transformation of Eastern Europe and Poland into a capitalist regime, changes in wages will accelerate the immigration and emigration of neighboring Eastern Europe. The shortage of human resources and demand continues in 2019 following in 2018. Eastern Europeans, especially Ukrainians, have recently entered the Polish labor market to make up for the scarce areas.

3. Hub mobility research

3.1 Mobility by city due to the wage

As a result, Poland's supply and demand in Ukraine is disproportionate. Wage increases are putting continued pressure on employers. Since January 2019 Poland's minimum wage has

increased to PLN 2,250 per month (7.1% higher than in 2018). It shows making in such a way that the minimum wage freezes in the Czech Republic[8] and sudden changes in the size of Ukrainian migrant workers in neighboring countries. Recently, Poland's legal wage increased to 14.70 zł (approx \$ 3.77) in 2019, and increased by 7.3% to 13.70 zł (approx \$ 3.52) in 2018. In 2019, wages increased by an average of about 6.4%. About 75% of Polish companies are raising employee salaries. This was due to the increase in household consumption and employment in April 2016 from the Polish government's Family 500+ policy to support child support. From 2015 to November 2018, the unemployment rate can be found to decrease in 9.7% (1.56 mill), 8.2% (1.34 mill), 6.6% (1.08 mill) and 5.7% (9.5 mill).

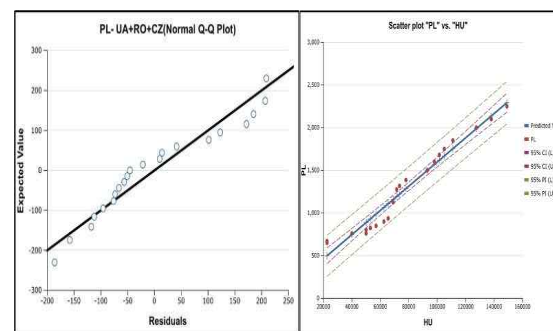


Fig. 1. Minimum wage (Local currency)[9]

* PL- UA+RO+CZ (R 0.9712, R²– 0.9432, Adjusted R²– 0.9331),
 * * HU- UA+RO (R 0.9735, R²– 0.9477, Adjusted R²– 0.9419),
 * * * PL-HU (R 0.9791, R²–0.9586, Adjusted R²– 0.9565)

Correlations from the above data on minimum wage indicate that Hungary and Poland have significant values with Ukraine, but not with Romania. This proves that the wages of the neighboring countries have been relatively high and have maintained their labor supply by raising their own wages. Conversely, a triangle relationship may mean that labor mobility is possible in cities with high wages. Then, what factors like chasm or wellbeing affect mobility other than wages in the triangular structure relations?

3.2 the global perspective

The main drivers of Poland's growth were continued investment in public funds and private consumption, and investment in EU funds. Despite the lowest tax cuts in the Eastern and Europe, demand for labor still remains. Since joining the European Union in 2004, it has consistently achieved positive economic growth through increased regional exports, foreign investment inflows and one of the biggest beneficiaries of the Polish EU Fund. In particular, the 2009 global financial crisis recorded the only positive growth among EU member states. The banking industry has strengthened fiscal stability and diversified overseas investment and capital outflows, until it has come the 2011 Euro-zone fiscal crisis. The industry diversification, economic diversification and fiscal stability have led to sustain economic growth in Poland. At the time the growth rate was more than double rate. Economic growth has attracted outside workers, it however does not necessarily create urbanization or hubs. Finally, as a worker's welfare, there are strong qualitative and cultural factors.

The Europe is making EV battery unionization, and EV Manufacturing keep reorganized battery supply[10,11]. The Panasonic' battery strategy is being completed European scope, top-of-the-line supply chain management, integrated logistics. Korean' EV Battery companies were entering into the market through triangular hubs of DE,PL,HU.

4. Empirical analysis

How does mobility change in urban triangles? Are labor immigrants advanced or low level-quality manpower? Poland has been moving in from Ukraine, Lithuania, Russia, Belarus. And Hungary has migrated in from Romania, Slovakia, Ukraine. On the other hand, Poland and Hungarians commute to Germany.

A comparison of the number of job seekers registered in Eastern Europe with the number of dwellings, and a regression analysis of the economically active population and the number of registered job seekers show that hub for industries. In cities and regions the structure is being restructured in the manufacturing sector, a regional hub is creating and retaining on workers for migration inside and outside the country.

The following is a regression analysis of Hungary's four neighboring electric vehicle-related batteries and the proportion of the population that has settled and the economic activity of job seekers in investment areas.

$$Y = -20.32 + 1.86x - 0.01x^2 \quad R^2 = 0.971133 \quad (1)$$

$$Y = 22.42 * 1.01^x \quad R^2 = 0.475156 \quad (2)$$

Regression analysis is a linear relationship analysis (1). If it put a squared term, they can analyze the relationship between the curves. For example, the ratio of job seekers' economic activity takes the form of a concave (convex upward) quadratic curve that decreases at any group, which is a fixed and increasing as settlers.

However, in exponential function, (2) $Y = 22.42 * 1.01^x$. Although $R = 0.475156$ is still insufficient, the exponential function can explain natural population phenomena in real life.

Table 2. Economically Active People

[illegible]

However, natural migration along the exponential function can not be observed in various surrounding areas introduced on the 4th industrial life. Regional hubs are also hubs of manufacturing bases, and jobs are not growing exponentially but the region grows.

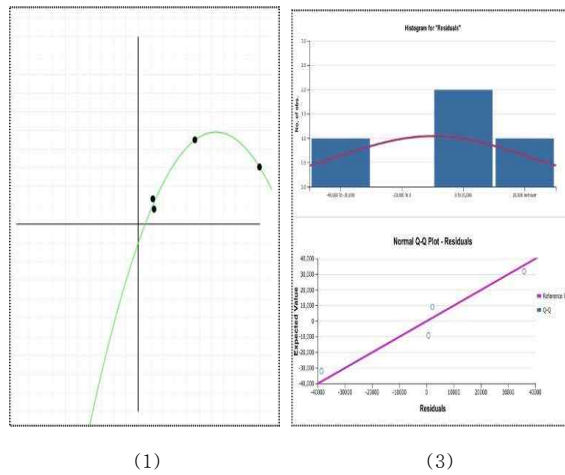


Fig. 2. Regression analysis of Central hub due to worker commuting and settlement(1) & the housing average price in hub cities near Plants for Economically Active People(3)

MNEs have continually relocated production factories to globalize the 4th wave re-industry(N_2) and ensure low wages. However, labor migration is moving faster. In the case of Europe, it will be concentrated in the existing Visegrad area, which is the existing hub factory(N_1), and will be turned into a hub and automated. As building a gravity hub it is to attract human resources from around the new industrialized city(N_2), both home and abroad. The greater the power of the hub as gravity model, the more leisure and living time have in urban areas.

$$R^2=0.9988 \quad (3)$$

Therefore, a regression equation in the form of job-seeker's economic activity ratio, $y=AX^2+B$, (x =settlers), can be used to grasp the relationship between curves. According to the domestic and foreign workers who migrated, economic activities was rather than increasing the local population, the settlers of nearby large cities is more proportional. When compared with the existing manufacturing industry(N_1), it could be analyzed that the manufacturing industry for the 4th wave industry(N_2) is making hubs on the surrounding cities [12, 13].

When comparing European housing prices, Hungary and Poland showed a surge (2017 to early 2020). It's correlation between housing prices between triangular hub cities in production-related countries. This led to rise settlers which are proved to have expanded into cities rather than production areas.

As Hungary's welfare system has been reduced, its residence in wellbeing-equipped hub cities is becoming more crowded than its production base.

(1) Hubs near manufacturing facilities

Finally, it is due to EU policies that are reluctant to participate effectively and economically in the EU. Since the transition, Poland has achieved relatively economic development. Previous research on this has referred to Gomułka (2019) as Poland's green island phenomenon. During 2001–2004 (IA), Poland's GDP growth was the lowest among the eight transition economies in Central and Northern Europe. Between 2001 and 2015, the leaders of economic growth were Slovakia and Lithuania. Even Bulgaria, Latvia and Romania

Table 3. Housing price on PL & HU triangular hub cities [14]

Poland = 20.5057 + 0.8020 * Czech Republic - 0.1084 * Germany + 0.0123 * Romania									
	Coefficients	Std Err	LCL	UCL	t Stat	p-value	H0 (5%)	VIF	TOL
Intercept	20.5057	7.5803	2.5812	38.4303	2.7051	0.0304	Rejected		
Czech Republic	0.8020	0.0789	0.6154	0.9887	10.1628	1.9232E-05	Rejected	17.8338	0.0561
Germany	-0.1084	0.1355	-0.4287	0.2119	-0.8003	0.4498	Accepted	26.9985	0.0370
Romania	0.0123	0.1545	-0.3530	0.3775	0.0793	0.9390	Accepted	16.2448	0.0616

Hungary = -17.4717 - 0.8641 * Austria + 2.7474 * Czech Republic - 0.2136 * Germany - 0.5428 * Romania									
	Coefficients	Std Err	LCL	UCL	t Stat	p-value	H0 (5%)	VIF	TOL
Intercept	-17.4717	69.8377	-188.3584	153.4149	-0.2502	0.8108	Accepted		
Austria	-0.8641	1.3030	-4.0524	2.3242	-0.6632	0.5318	Accepted	59.5074	0.0168
Czech Republic	2.7474	0.6984	1.0384	4.4565	3.9336	0.0077	Rejected	54.2687	0.0184
Germany	-0.2136	0.7384	-2.0204	1.5932	-0.2893	0.7821	Accepted	31.1727	0.0321
Romania	-0.5428	0.7875	-2.4697	1.3842	-0.6892	0.5164	Accepted	16.4063	0.0610

achieved better results than Poland. With regard to the 2009–2015 (II) period, what differentiates Poland most is the banking crisis. This is especially true during the global financial crisis (2008–2009).

Poland is the only country in Europe that has not had a recession in the last decade and is called Europe's "Green Island". However, the new risks that Poland cannot technically narrow the development gap for most developed countries depends on the labor market [15], public debt and unusually fast liberal reforms. This suggests that as the labor market tightens, there is a wage pressure to increase inflation. As a result, commuters to Germany were expanded and their consumption increased in cities around Germany. In the end, the phenomenon of green islands developed into a hub for labor migration.

(2) Local Workforce Mobility

Despite the lowest tax cuts in the Eastern Europe, the demand for workforce remains. Poland is a country that actively promotes commercialization strategies. It is an incubator distributed in several places in Poland, and there are more than 10 places nationwide. Various support is provided by the government. The sixth partner for a German company employs more than 300,000 people (6,000). Poland accounts for 28.2% (2018) of Germany's total exports and 22.4% of imports. Poland and Hungary, manufacturing partners in these German neighbors, ensured that the movement of the central hub created a triangular wheel plot for imports and exports. Therefore, the number of inter-state labor commuters is as important as the speed of inter-state trade.

4. Conclusion

The speed of trade between nations is such that the central hub city moves to the

surrounding cities as large as the number of commuters between nations. So, Poland has a production capacity before the system change, but in the early days, foreign technology and capital were acute either it merged, or etc.

Conversely, this mobility for the welfare explains the reasons for building a hub city in Eastern Europe. And especially well-trained and inexpensive labor has very favorable conditions for communal market entry and production development.

Inhabited hub cities with wellbeing equipped culture is becoming more crowded than its production base. This's a cause of chasm as the welfare system or equality is reduced overall each state. So they give a mobility to unemployed people in Western Europe as well as Eastern, such as Belarus, a neighboring in V4, for having secured a high supply and demand of human resources, making V4 a city hub of commercial wellbeing- developments.

REFERENCES

- [1] S. Clauwaert & I. Schömann & N. Buetten & Z. Rasnača. (2016). *The crisis and national labour law reforms: a mapping exercise. Country report: Poland*, Retrieved from <https://www.etui.org/content/download/7462/71661/file/Luxembourg%20country%20report%202013-2016.pdf>.
- [2] International Organization for Migration (IOM). (2020). *WORLD MIGRATION REPORT 2020*, Retrieved from https://www.un.org/sites/un2.un.org/files/wmr_2020.pdf.
- [3] A. Szeptycki.(2016). POLAND–UKRAINE RELATIONS, *Revista UNISCI/UNISCI Journal*, 40(1), 57–76.
- [4] M. Krasnodebska. (2014). Europeanization of Poland's Strategic Culture: Managing the 2013/14 Ukraine Crisis, *the European Journal of Political Research*, 1–8.
- [5] URBIS. (2017). *Growth perspectives for polish ICT sector by 2025*, Retrieved from https://urbis.europarl.europa.eu/urbis/sites/default/files/generated/document/en/2017_ict_sector_by_2025_en.pdf.
- [6] S. Gomułka. (2019). Poland's Economic Performance in Global and Long-term Perspective: Surprises so far

- and Risks in the Years Ahead. *Central European Economic Journal*, 5(1), 109–117.
- [7] M. Feltynowski. (2012). “ICT clusters diagnosis in Poland”, *J. of European Economy*, 11(4), 403–415.
- [8] I. Jenerálová. (2011). *Main pillars of Czech industry*, Retrieved from www.czech.cz/en/Business/Economic-facts/Main-pillars-of-Czech-industry.
- [9] Eurostat (2020). *Minimum wage statistics*, Retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Minimum_wage_statistics.
- [10] D. S. Seo. (2018). Strategy of Market Spread-Commercialization in EVs Industry: Visegrad and Nordic Countries. *The International Journal of Industrial Distribution & Business*, 9(3), 57–68.
- [11] D. S. Seo. (2017). The investment point on cooperative innovation in EVs for the spoke-smart cities: focused on Nordic countries and Korea. *The Journals of Economics, Marketing & Management*, 5(3), 1–11.
- [12] D. S. Seo. (2016). The Role of Innovative Energy Public Firms’ Channels according to Shale Gas for E-Convergence Economy. *The Journal of Distribution Science*, 14 (5), 17–26.
- [13] D. S. Seo. (2016). The Commerce Strategy towards Pan-European Innovation and Consumption: Spokes Partnership for FDI of Korea. *Journal of Internet Banking and Commerce*, 21(S2), 1–7.
- [14] HCSO(Hungarian Central Statistical Office). (2019). *Statistical reflections, Publication repertory, Housing prices, housing price index*, Quarter 3.
- [15] T. Kościński. (2017). *the Undersecretary of State at the Ministry of Economic Development ICT SECTOR BY 2025*. Retrieved from https://www.parp.gov.pl/storage/publications/pdf/2017_ict_sector_by_2025_en.pdf

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