

The Effects of Physical „Wounds” Arising from Deindustrialization on the Labor Market

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Abstract

The regions in depression due to deindustrialisation – the old industrial regions – can be defined by common internal characteristics, characterised by brownfields springing into existence, dwindling human potential, labor market depression and secondary migrational push. Following deindustrialisation appearing the brownbelts. Their complex revitalization is a very important question, especially in the aspects of the labor market. In this article I prove the autocorrelation between the brownfields and the labor market on the subregional level in Hungary with two regions characterized by negative deindustrialization. I used Moran's I to analyze regional autocorrelation between brownfields and labor market indicators. Furthermore, I discuss microregions smitten by industrial depression in detail. I analyze the following hypothesis in this article: in Hungary brown fields came into being following deindustrialisation, especially negative deindustrialisation, which influence the labor market of the region on the subregional and local level.

Key words: deindustrialization, brownfield, labour market

JEL Classification: O20, R23

1 Introduction

There is no unified consent on which regions to group into brown fields in the international literature. Brown fields are industrial regions with low efficiency in utilisation, or are abandoned altogether. Inefficiently utilized or abandoned railway lines and vacated military areas belong to this category, too (Barta, 2002). According to CLARINET (Contaminated Land Rehabilitation Network Technologies) a brownfield is a region which has previously been in use and is currently abandoned or is in little usage; has disclosed or supposed contamination problems; is mainly located in an urban setting; needs intervention in order to be efficiently reutilized (Ferber - Grimski, 2002). The COBRAMAN 2008-2011 project – financed by the European Union – realizes the improvement of brown fields by cooperating with Slovenian, Czech, Polish, German and Italian institutions. The international literature is not unified in grouping regions into brown fields. In Germany they concentrate on the rehabilitation and refurbishment of urban areas. In Italy such areas are considered contaminated, where the physical, chemical and biological

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contaminants are present in a concentration bigger than the accepted level. In Poland these are called degraded areas due to diffuse soil contamination and a high density of landfill sites in urban areas. In Spain the definition is the same as that of the unused industrial areas. In Romania there is no official definition for brown fields, but mostly they refer to potentially contaminated sites and industrial ruins with this category. In Canada these brownfields are contaminated, under-utilized and unproductive areas. The lack of a unified database is the main problem in the research of brown fields. According to Oliver et al. (2005) the two most affected countries were Poland and Romania. Further significant brown fields were located in the United Kingdom, the Czech Republic, Belgium and Germany. The definition VÁTI - Hungarian Regional Development and Urban Planning Nonprofit Ltd. provides is that a brown area (or rustbelt) is an unused or underutilized industrial site, agricultural area or abandoned or unused army base, usually in a state of physical decay and/or wrought with pollution. In Enyedi's definition (2005, p 126):

„A brownfield is a microgeographic urban phenomenon, the regulation of which is the responsibility of urban politics. Not to be confused with a rustbelt, which refers to traditional heavy industrial (metallurgy, industrial machinery manufacturing) sites, so region-paced regional politics can interfere with their fate.”

There are two deindustrialized regions in Hungary: Northern Hungary and Southern Transdanubia. Apropos of the conceptualization of negative deindustrialization regions it became clear that the change of internal endogen factors takes place first. On one part the presence of non-revitalised brown fields can be such internal endogen factors. Thus I analyze in detail the brown fields arising after the industrial decline in the aforementioned areas. The following figure shows the basic presumption of my research, namely that if deindustrialization is followed by social and environmental degradation, the thus avoided revitalization has further negative effects on society.

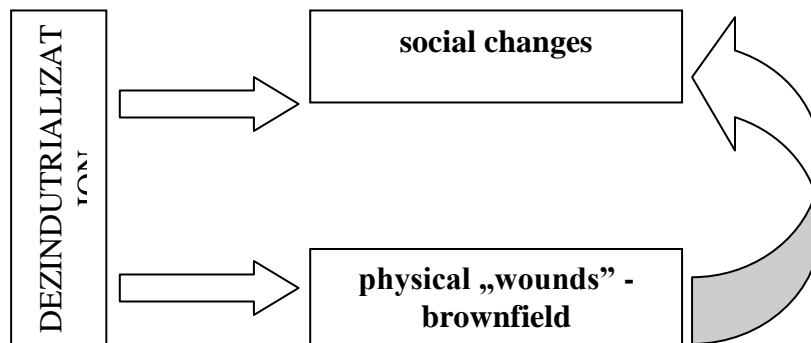


Fig. 1 The connections between social and physical wounds

Source: own work

In various literature (VÁTI – Hungarian Regional Development and Urban Planning Nonprofit Ltd., 2003, 19.o.) it appears that there is no evincible connection between the presence of brown fields and unemployment rate. Furthermore, in the Hungarian literature it wasn't explored what kind of connection there is between brown fields and the state of society, which, in my opinion can be best characterized by labor market indicators. In this article I prove these conceptions wrong, which are especially cumbersome mistakes as in economic policies they prepared development plans based on such views. In the first chapter I formulated how a complex development policy has to integrate the goals of regional development, employment policy and industrial development in connection with the receding industry. By examining the labor market relevancies of brown fields in the scope of regional and industrial development on local and

subregional level I aim to analyze the necessity of these three policies joining forces in this chapter. With my research I contribute to setting these regions on the path of development.

2 The Effect of Brown Fields on the Labor Market

I prove the connection between the presence of brown fields and the state of the local labour market. For my method I chose to supervise definition of industrially depressed microregions.

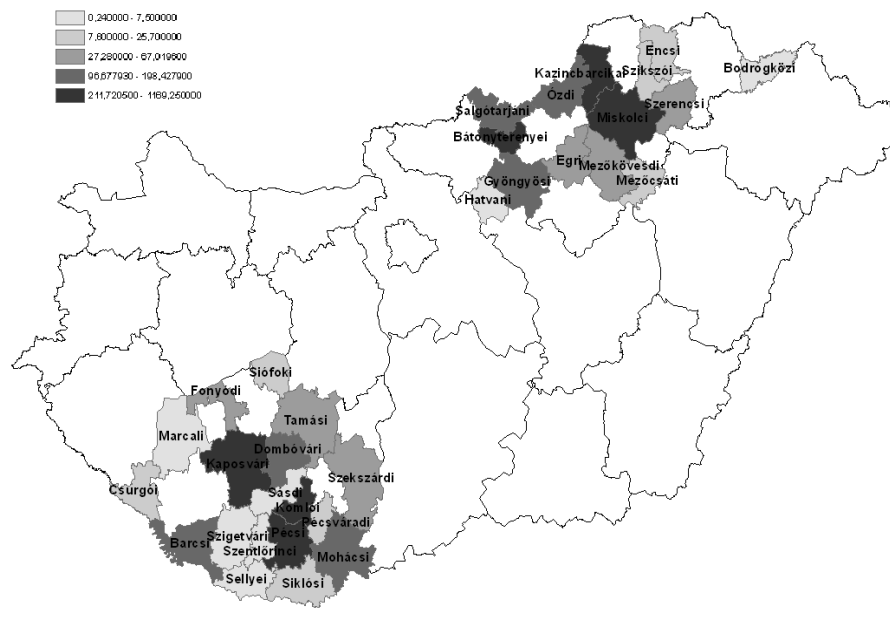


Fig. 2 Extent of brown fields (ha) in Northern Hungarian and Southern Transdanubia regions

Source: own work

I suppose this classification did not take the presence of brown fields into consideration and their significance in regional depression. In the following picture I present the extent of these regions in the aforementioned Hungarian regions on the local level. In the ÉMOP (Northern Hungarian Operative Program) they located 2213 ha of brown fields in Northern Hungary in 2005, but Paulovics-Körösi (2011) assessed 3286,5 ha in 2010. In the Southern Transdanubia region 1970,6 ha of brown belts have been located in 2006. In the 2003 study VÁTI - Hungarian Regional Development and Urban Planning Nonprofit Ltd. pointed out that Borsod-Abaúj-Zemplén county stands out of the rest concerning both the number of settlements affected by brown fields and the size of industrial brown fields (VÁTI - Hungarian Regional Development and Urban Planning Nonprofit Ltd., 2003). In the following I shall use the data provided by ÉMOP (Northern Hungarian Operative Program) and DDOP (Southern Transdanubia Operative Program), as I find them more realistic concerning, for example, the case of Miskolc, where ÉMOP found 1169,25 ha, whereas VÁTI only mentions a 235 ha extension. To support my hypothesis I examined the spatial autocorrelation index of Local Moran's I in the Northern Hungary and Southern Transdanubia regions. It is important to take neighborly relationships and their effects on the neighboring regions into consideration when examining brown fields. A significant workforce commuted to the former industrial sites from the neighboring areas. Beside the neighborhood matrix (tangentially adjacent areas included) I used the extent of brown fields instead of distance

weights when calculating Local Moran's I. Namely because I believe large brown fields have effect on settlements farther from the examined areas (Tóth, 2003) due to commuting to the industrial sites. Regarding the territorial extent of brown fields I used the results of the 2005 ÉMOP (Northern Hungarian Operative Program) survey. The data about the unemployment rate was retrieved from the National Employment Service. In this instance only the data between 2002 and 2009 were available, I used the data between 2004 and 2008, as the effects of the economic recession were not yet visible in that period. I used the following formula based on the calculations made by Local Moran's I:

$$I = \frac{\sum_{i=1}^N \sum_{j=1}^N (x_i - \bar{x})(x_j - \bar{x}) D_{ij}}{\sum_{i=1}^N \sum_{j=1}^N D_{ij} \sum_{i=1}^N (x_i - \bar{x})^2}$$

Equation 1: Local Moran's I based on (Tóth, 2003)

The indicators are to be interpreted as the following :

- $I > -1/N-1$, positive spatial autocorrelation,
- $I = -1/N-1$, no spatial autocorrelation,
- $I < -1/N-1$, negative spatial autocorrelation

Since I performed calculations on 28 subregions from the Northern Hungary region, the correlation was -0,03571 in this case. The results of Local Moran's I are listed in the following table, based on which we can conclude that there is a positive spatial autocorrelation between the extent of brown regions in a subregion and the unemployment rate, employment rate and participation rate in that subregion both in 2004 and 2008. In the research periods the autocorrelation of brown fields with unemployment rates and employment rates grew in the subregions of the Northern Hungary region, while the participation rate declined.

Tab. 1 Indicator number results from Local Moran's I in the microregions of Northern Hungary region

	2004		2008	
	Local Moran's I results		Local Moran's I results	
Unemployment rate	0,537609	positive spatial autocorrelation	0,583446	positive spatial autocorrelation
Participation rate	0,665688	positive spatial autocorrelation	0,411570	positive spatial autocorrelation
Employment rate	0,684795	positive spatial autocorrelation	0,785656	positive spatial autocorrelation

Source: own composition based on NES data

I used a similar technique to define the neighboring microregions in the Southern Transdanubia region. I used the DDOP (Southern Transdanubia Operative Program) data collected in 2005 to define the territorial expansion of brown fields. Similar to the Northern Hungary region, there is a distinguishable connection between the location of brown fields and the labor market indicators. However, in this region the Local Moran's I numbers are significantly smaller in the examined period and the change rate is smaller, too.

Tab. 2 Indicator number results from Local Moran's I in the microregions of Southern Transdanubia region

	2004		2008	
	Local Moran I. eredménye		Local Moran I. results	
Unemployment rate	0,089120	positive spatial autocorrelation	0,104971	positive spatial autocorrelation
Participation rate	0,178088	positive spatial autocorrelation	0,180042	positive spatial autocorrelation
Employment rate	0,172712	positive spatial autocorrelation	0,185485	positive spatial autocorrelation

Source: own composition based on NES data

In the previous paragraphs I demonstrated the spatial correlation between the size of brown fields and the labor market indicators. If we disregard the spatial connections and only analyze the correlation of labor market indicators and the expanse of brown fields on a subregional level, a significant connection cannot be established. According to my calculations there is a medial correlation in Northern Hungary (correlation coefficient $r=0,4347$) between the size of brown fields and the number of permanently unemployed (2009). That is why I do not consider those development programs efficient which rely on only one indicator group. In the following part I present the consequences this practice has on defining industrial depression sites in subregions. The definition of industrially depressed sites can have a significant impact on the development of these subregions in the form of aids and the realization of development plans. Following the changes in the industrial infrastructure in Hungary due to the lack of resources and ill-considered industrial and political interventions industrially depressed regions came into being. In 2001 legislators (with government regulation 91/2001 [VI. 15.]) put six microregions into this category based on the following criteria:

- the number of those employed in the industry was more than two times the size of the national average in 1990,
- the number of those employed in the industry declined between 1990 and 1999,
- the unemployment was above the national average.

Concerning the regions in this regulation, four microregions were from Northern Hungary and one from Southern Transdanubia and Central Transdanubia each. In my opinion the definition of industrially depressed subregions was cut too short by legislators with this limitation. In 2004 Ballabás-Voller expanded this group to 11 by including migrational differences (instead of unemployment) to the indicators. They identified six industrially depressed subregions in Northern Hungary, four in Central Transdanubia and one in Southern Transdanubia. The subregion of Tiszaújváros was included in this group due to the definition of Ballabás-Volter, although the rate of brown fields is extremely low and the TVK and other process manufacturing companies settled in the industrial park still represent a remarkable labour demand. At the same time it is necessary to increase the scope of the definition made in 2001, as Miskolc, for example, is not considered an industrially depressed microregion by the regulations. Upon establishing the aforementioned categories they did not take the brown belts arising from the changes in the industrial infrastructure into consideration, the position of which is predominantly characteristic in Northern Hungary and Southern Transdanubia. I wished to examine which subregions are listed among the industrially depressed ones since 2004. The old industrial regions' international literature (OIR) uses regional GDP and labour market indicators to categorize. Regarding the

number of people employed in the industry the data of the 2001 census are available. In my opinion from the years following the 1990s the data from 2001 are relevant concerning what size the number of workers employed in the industry shrunk to in a subregion. Despite that a lower number can go with a higher number of people employed in the tertiary sector, I believe the ratio of people employed in the industry can provide relevant information about the labor force of the subregion and the deindustrialization process. Regrettably the next source of data on the subregional level is the next census, and in 2004 the subregions were redrawn, thus making comparisons rather difficult. I took the inactivity rate into account as a labour market indicator. I found including this indicator important as with the receding industry the former industrial skilled workers who could not find their place on the labor market could seek refuge in inactivity. A good example of this phenomenon is the subregion of Ózd, where despite the high number of workers employed in the industry, high employment rates are long since not characteristic to the labor market of the subregion. At a later point in the chapter I define the labor market depression, but in connection with this I believe that the industrially depressed areas are characterized not only by migration, but also by a secession from the labor market as a whole. Data concerning inland migrational differences between 2000 and 2011 were available. The ten year span perfectly indicates how appealing a region is for employees, thus I chose to include it in the model. I analyzed the ratio of those brown fields above 90 ha in size and compared them to the size of the subregion. In both cases I got near identical results, which did not influence the final conclusion. In the case of individual indicators I compared them to the regional levels and checked if the above average results were characteristic to the individual subregions.

I studied the following indicators on a subregional level in the two regions:

- ratio of those employed in industry in 2001 (the government regulations and Ballabás take the conditions in the 1990s into account, too, but nowadays the next 10 years is relevant),
- ratio of inactive workers – instead of unemployment rate (2004),
- inland migrational margin – used by Ballabás between 2000-2011,
- ratio of brown fields.

Thus I included those subregions in the category where there was at least one above average (inactivity rate, inland migrational difference) or below average (number of industrial workers) rate was characteristic. Therefore in my definition these subregions are industrially depressed, where the extent of brown fields exceeds the third of the regional average, and there was at least one unaverage indicator. I concluded my findings in the following table:

Tab. 3 Industrially depressed subregions in Hungary in regions characterized by negative deindustrialization

Extent of brown fields in subregions in Northern Hungary and Southern Transdanubia		Government regulation of 2001 (subregions)	Ballabás-Volter 2004, (subregions)	Hegy-Kéri 2014 subregions
Miskolc	1169,25 ha		Miskolc	Miskolc
Kazincbarcika	216,32 ha	Kazincbarcika	Kazincbarcika	Kazincbarcika
Bátonyterenye	211,72 ha	Bátonyterenye	Bátonyterenye	Bátonyterenye
Ózd	165,44 ha	Ózd	Ózd	Ózd
Salgótarján	96,68 ha	Salgótarján	Salgótarján	Salgótarján
Szerencs	27,28 ha			Szerencs
Tiszaújváros	0 ha		Tiszaújváros	

Pécs	297,50 ha			Pécs
Barcs	198,43 ha			Barcs
Dombóvár	96,76 ha			Dombóvár
Kaposvár	604,556 ha			Kaposvár
Bonyhád	1814 ha			Bonyhád
Komló	307,89 ha	Komló	Komló	Komló

Source: own composition

3 Conclusion

On a subregional level there is evincible autocorrelation between the size of brown fields and the state of the labor market in the Northern Hungary and Southern Transdanubia regions. In conclusion I find it important to incorporate the size of brown fields into the definition of industrially depressed territories. Compared to the definition made by the government regulation of 2001 and Ballabás-Volter (2006) I extended the circle of industrially depressed regions with five subregions from Southern Transdanubia: Pécs, Barcs, Dombóvár, Kaposvár, Bonyhád. Concerning Northern Hungary (Ballabás-Volter, 2006) I excluded Tiszaújváros from my group of industrially depressed territories but included the subregion of Szerencs and Miskolc as opposed to the government regulation of 2001.

References

- BALLABÁS G. – VOLTER E. (2006): Development model for former crisis areas based on environmental testing .In: III. Hungarian Geographical Conference scientific publications, Budapest, 2006. September 6-7. Madarász Balázs –Kovács Alexandra editors, pp. 1-13.
- BARTA GY. (2002): Spatial process of the Hungarian industry between 1945-2000. Budapest-Pécs, Dialóg- Campus Kiadó.
- BICZÓ G. (2011): The lack of sociocultural aspects in brownfield developments in Hungary, conference presentation Wydawnictwo Uniwersytetu Jagiellońskiego III International Scientific Conference on ‘Modern Management of Public Affairs’
- CLEANING UP THE PAST, BUILDING THE FUTURE - A NATIONAL BROWNFIELD REDEVELOPMENT STRATEGY FOR CANADA (2003): National Round Table on the Environment and the Economy.
- DANSON M. (2005): Old Industrial Regions and Employability. *Urban Studies*, Vol. 42, No. 2, 285– 300, February 2005
- ENYEDI GY. (1989): Shaping the settlement process and settlement policy in Hungary. In.: *Valóság*, 32. 1989. 8. 62–72. p.
- ENYEDI GY (2005): Brownfields of Budapest, In.: *Könyvszemle, Magyar Tudomány*, 2005. vol.1126. pp.
- ENYEDI, GY. (1998): Transformation in Central European Postsocialist Cities, Hrubí, L. (Ed.). *Discussion Papers*, No. 21, Pécs: Centre for Regional Studies.

- GROSZ A. (1999): The future of old industrial cities and industrial areas under the restructuring - the FOCUS project. Summary of conference report. Cracow, 1999. november 8-9. In.: Space and Society. XIII. vol., 1999. number 4. pp. 135-139.
- HAJDÚ I. (2009): Steel City: the interaction of society and architecture. Association of North East Passage 'Once upon a time was Steel City "2008-2009. Download: <http://www.atjarokhe.hu/wp-content/uploads/2009/12/hajdu-ildiko-acevaros-tarsadalom-es-epiteszet-kolcsonhatasaban.pdf>
- HEGYI-KÉRI Á. (2013): The physical and social consequences of deindustrialisation relationship Miskolc. Diploma work. University of Miskolci. Faculty of Arts. 2013.
- HORVÁTH GY. (1998): European regional policy. Dialóg Campus Press, Budapest—Pécs.
- HUDSON R. (1994): „Institutional change, cultural transformation and economic regeneration: myths and realities from Europe's old industrial regions in Amin A and Thrift N (Eds.), Globalization, Institutions and Regional Development in Europe, Oxford University Press, Oxford, 331-45.
- IONESCU .– HEROIU M. –KESSIDES C. –POHL W. –VETMA N. (2010): The Management of Brownfield Redevelopment, Europe and Central Asia Region Sustainable Development Department, March 8th, 2010.
- KISS É. (2010): Territorial restructuring of the Hungarian industry after 1989. Dialóg Campus Press, Budapest-Pécs, 2010
- LUX G. (2009): The traditional industrial spaces of the old industrial areas. In.: Spatial and Society 23. vol. 2009. 4. number 45-60. pp.
- MIHÁLYI H. - PAPP Z. A. - SZABÓ-TÓTH K. (2011): Social Map of Miskolc, 2011 Colleagues of the Institute of Sociology Download: <http://szociologiaszak.uni-miskolc.hu/docs/miskolcterkep.pdf>
- OLIVER L. – ET AL. (2005): Sustainable Brownfield Regeneration: Cabernet Network Report. University of Nottingham.
- PALÁDI-KOVÁCS A. (2007): Industrial land, Akadémiai Press, Budapest
- PAULOVICS J. – KŐRÖSI V. (2011): The results of the survey of brownfield North Hungary region. In.: Knowledge Network and Clustering, Norrie publication, 174-183 pp.
- SKRABSKI Á.-KOPP M. (2007): The trust as a central feature of social capital. In.: Vigilia 2007. 12. number Download: <http://www.vigilia.hu/2008/10/skrabski.htm>
- TAKÁCS Z. (2004): The industry phenomenon of degradation of some foreign examples in .: economic situation in Northern Hungary, 1990-2001 data, trends, analysis Edited by: Tóth I. János, Kopint-Datorg 2003, Budapest, 13-26. pp.
- VÁTI - HUNGARIAN REGIONAL DEVELOPMENT AND URBAN PLANNING NONPROFIT LTD. (2003): Professional foundations under the EU Structural Funds value to be printed brownfield rehabilitation projects (preparatory study). Supervisor: Agnes Nagy, Budapest.