

**Does China's Opening-up De-industrialize Europe's Center and
Industrialize its Periphery?**

Work in Progress

Preliminary Draft

by

Günter S. Heiduk*
Yue Jiang[#]

Preliminary draft presented at the

International Conference of RCIE, KIET, and APEA

on

China and the World Economy

March 16, 2012, Seattle

I

* Professor and Head, East Asian Center, Warsaw School of Economics, Warsaw, Poland
gheidu@sgh.waw.pl

Master student, School of Economics Fudan University, Shanghai, P.R. China, and exchange
student, Warsaw School of Economics
10210680006@fudan.edu.cn

Abstract

China's accession to the WTO in December 2001 has significantly changed the global division of labor. In combination with the earlier implemented policy to attract foreign direct investment China emerged as the "manufacturer of the world". In the last decade the share of manufacturing on GDP increased considerably. Sourcing to China decreased manufacturing in industrialized countries. Multinational companies fragmented their value chains and established production plants for parts and components in China or outsourced labor-intensive production to Chinese producers. The fast growth of manufacturing in China resulted in positive and negative effects. The latter are manifested in increasing wages, pressure on inflation, financing bottlenecks. There is evidence that China's competitiveness in manufacturing is decreasing. Multinational companies already started to re-allocate their foreign production plants from China to other countries. Near-shore countries may be the winner. De-industrialization in European, American and East Asian core countries and parallel industrialization in China has led to a shift in the centre of the economic geography to the East. This trend seems to lose steam which opens chances for peripheral countries in Europe, Middle and South America, Asia to industrialise. The paper is aiming to test this hypothesis by using a gravity model and a data set from Germany, China, Albania. The result confirms the hypothesis but needs stronger evidence firstly by using a comprehensive data set of trade, FDI flows and FDI stocks, and secondly by specifications regarding industry, regions, even locations.

Keywords: Fragmentation, Vertical Specialization, Core-Periphery Countries, De-Industrialization, Albania, China, Germany

I. Introduction

China's accession to the WTO in December 2001 has significantly changed the global division of labor. The pattern of trade which emerged after China's opening-up in 1978 had been in accordance with the Heckscher-Ohlin trade model: China starts exporting labor-intensive consumer products and importing capital-intensive goods, predominantly parts and components to establish/modernize its heavy industries. The increased global labor supply with basic education has reduced the comparative advantage of the low-skill work force in other developing countries. The WTO membership obliged China to remove market access barriers which amongst others raised the expectations of foreign investors for lower risk premium. Capital - generated in industrialized countries - had been allocated to China instead of other countries at the periphery of the industrial centers in Europe, North America or East Asia. China's opening-up policy started with the "Regulations for the Special Economic Zone of Guangdong Province" which passed the National People's Congress in August 1980. A part of Shenzhen was officially declared as "Shenzhen Special Economic Zone". Since then the policy of attracting foreign investment has been geographically extended and economically diversified. 32 state-level economic and technological development zones, 53 new and high-tech industrial development zones, 15 free trade zones are scattered over China. The main characteristics are the functioning of market mechanisms, the legal requirement of Sino-

foreign joint ventures or wholly foreign-owned enterprises, and the primarily export-oriented production. This concept of attracting foreign capital and mobilizing China's large and cheap labor force resulted in a fast industrialization of the preferred cities/regions. China's relatively low technological level on the one hand and its abundant but low-skill labor force on the other hand concentrated foreign investment in manufacturing standardized parts and components and exporting these goods back for assembling. Off-shoring of parts of the value chains to China accelerated the process of de-industrialization in "old" industrialized countries. After ten years of China's WTO membership the pattern of the global division of labor seems to change again. Technological spill-over effects – accelerated by high investment in human capital – increase the attractiveness of China as a location for off-shoring total production processes. Furthermore, fully integrated foreign production plants create the basis for the emergence of competitive national industries (e.g. automobile industry). Industrialized countries mutate to knowledge producers and China is emerging as a newly industrialized country with a promising market potential. As a consequence China's location advantage for mass manufacturing of parts and components will gradually fade away. MNCs from Europe, USA, Japan, Korea as well as more and more Chinese MNCs have to think on relocating their parts and components production from China to peripheral countries. Industrialization processes in Southeast Asia point in this direction. Free trade agreements in Asia seem to create favorable conditions for intensified trade flows within this region.

The paper argues that Europe's periphery has similar chances to industrialize when the core countries de-industrialize and China emerge as the most dynamic industrializing country. The ongoing technological process of fragmenting value chains accompanied by decreasing transport and logistics cost promote the globalization of production networks rather than the clustering which offers new opportunities especially for European peripheral countries compared to the periphery in other parts of the world. Difficulties with cross-cultural communication and management in Sino-foreign joint ventures or wholly foreign owned enterprises may contribute to prefer near-shore investment when it comes to relocating the value chains.

China's full integration into the international division of labor suggests a new pattern of de-industrialized and newly industrializing countries resulting in changes in the volume and composition of regional and probably global trade and investment flows. In order to make full use of the potential of increase in welfare, both economic policy and business in both types of countries have to accept and manage the challenges resulting from the changing pattern of the international division of labor.

The remaining paper is organized as follows: Section II reflects the discussion on patterns of sectoral change. Then sketchy description of China's emergence as the global center of manufacturing follows in section III Observations on recent developments in FDI and trade of Germany, China and Albania should deliver in section IV the basis for a set of hypothesis which is put forward in section V. The model is presented in section VI followed by the data analysis in section VII. The conclusion highlights the result and offer proposals for future research.

Note that the current version does not include the test of FDI and trade flows between Germany and China, respectively Germany and Albania.

II. Patterns of Sectoral Change

It is well accepted that today's core countries experienced a gradual industrialization in the first phase after the industrial revolution. Whereas the labor force in the agricultural sector decreased in the second half of the 19th century, the employment in the industrial sector increased considerably and in the service sector moderately (table 1, left part). There is strong evidence that in countries with drastic structural change the overall benefits measured by increase in GDP per capita were higher than in slowly changing countries (table 1, right part).

Table 1 Sectoral Labor Force in Britain, Germany, France , in %, and Estimated GDP/Capita in US\$ of 1990, Selected Years

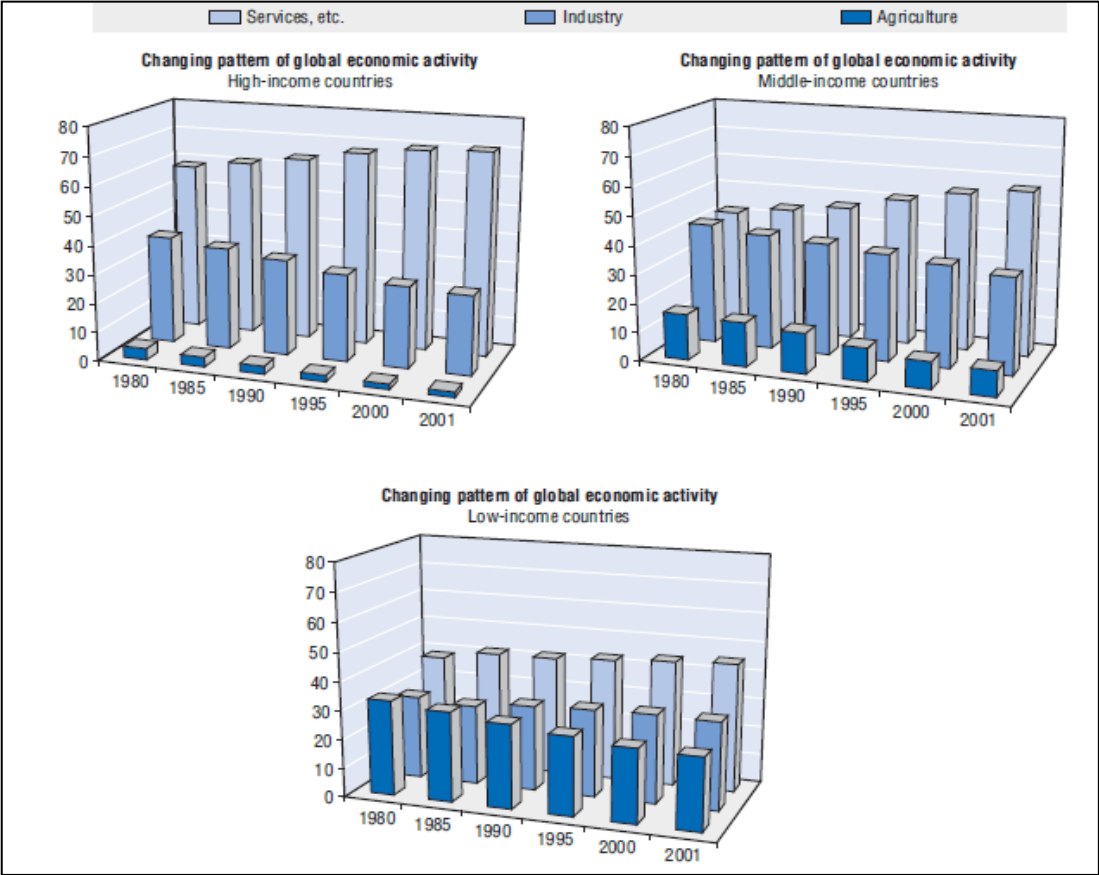
| Country / Year | Sector | | | Year | Estimated GDP/capita (US\$ 1990) |
|----------------|-------------|----------|---------|------|----------------------------------|
| | Agriculture | Industry | Service | | |
| Britain | | | | | |
| 1851 | 23 | 51 | 26 | 1820 | 1707 |
| 1911 | 9 | 54 | 37 | 1913 | 4921 |
| Germany | | | | | |
| 1849 | 56 | 24 | 20 | 1820 | 1058 |
| 1907 | 35 | 40 | 25 | 1913 | 3648 |
| France | | | | | |
| 1856 | 52 | 27 | 21 | 1820 | 1230 |
| 1911 | 41 | 30 | 29 | 1913 | 3485 |

Sources: Fischer, 1985, p. 129 (left); Maddison, 1964, p 53 (right).

The structural change continued and even accelerated after World War II. But the pattern changed in favor of the service sector. The industrialized countries' service sector outpaced

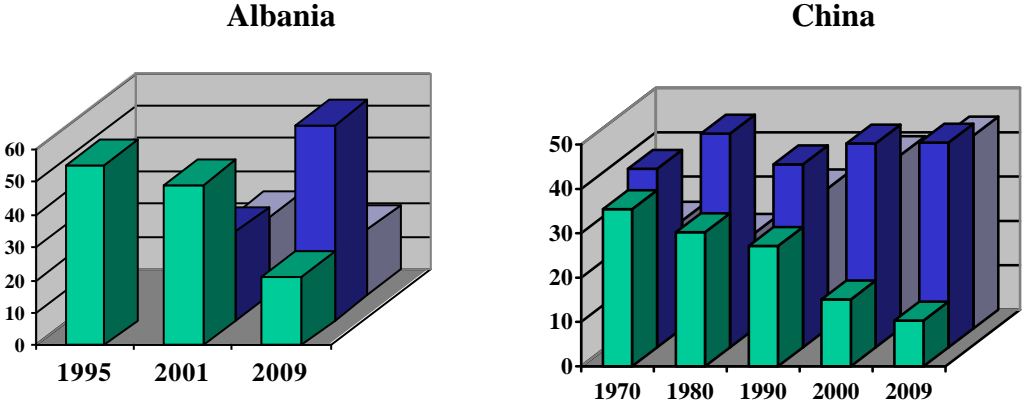
the industrial sector. The comparison with middle-income and low-income countries indicate that the lower the GDP per capita, the more favors the structural change the industrial sector (figure 1). A closer look at Albania, China and Germany confirm these income-related patterns of structural change (figure 2).

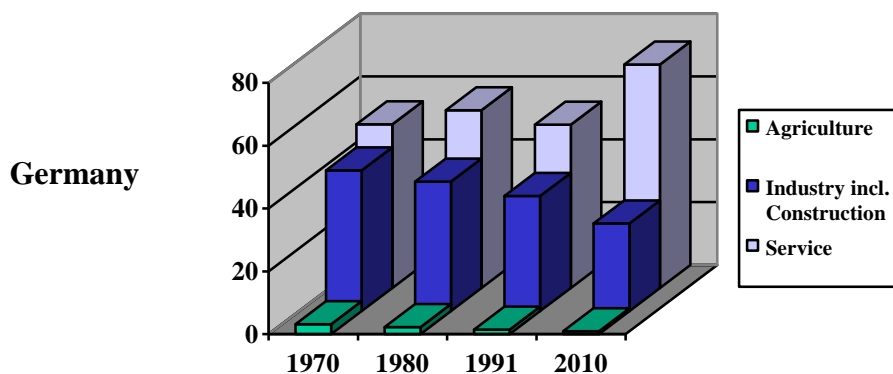
Figure 1 The Changing Pattern of Global Economic Activity



Source: OECD, 2005, p 5.

Figure 2 Sectoral Changes in Albania, China, Germany, 1970-2010, % of GDP





Source: Own calculations based on OECD, IMF, CIA Factbook Data.

Panel regressions which include all types of countries suggest an inverted U-shaped pattern of industrialization [Aizenman, 2001, p. 1]. Emerging economies reach their peaks in manufacturing's share on GDP when the GDP per capita catches approx. 60% of the US GDP per capita. In addition, financial sophistication has to match the catching-up process. More and more countries enter the phase of downward trend in manufacturing whereas few countries seem to be in the upward phase. Japan reached its peak in the middle of the 1980s, Korea at the beginning 1990s. There is evidence that China is now on its turning point.

At first view, there seems to be no causality that de-industrialization in high-income countries is connected with industrialization in emerging economies. Long-run observations of the price differential between tradable goods and non-tradable services suggest that the former tend to decrease and the latter to increase. The demand for services is price inelastic, the supply offers relative low opportunities for productivity growth. In contrast, manufacturing offers permanent chances for productivity improvements which in turn lead to decreasing relative prices. The result is an unbalanced growth between the service and the manufacturing sector. In the long run the share of the latter will increase and the share of the former decrease. These converse developments may cause a declining overall growth [Baumol, 1967; Baumol, Blackmand and Wolf, 1989].

Any kind of causality between overlapping industrialization and de-industrialization phases in high-come and emerging countries needs interdependencies between these countries by cross-border transactions or operations. Trade seems to be the most promising vehicle in quantitative analysis. Based on the Helpman-Krugman trade model [Helpman and Krugman, 1985] where the manufacturing sector is characterized by monopolistic competition with a large variety of differentiated products which are determined endogenously, free trade results in a decreasing number of varieties in the high-income (industrialized) country reducing the share of manufacturing. In contrast, the number of varieties in the emerging economy will increase resulting in an increasing share of the manufacturing sector. If a newcomer enters the global markets when the former countries reached their equilibrium (hence, building the high-

income block), their de-industrialization will continue. De-industrialization in high-income countries occurs even without trade with emerging economies, however, the existence of the latter magnifies in a free trade situation this downward trend in the share of manufacturing.

So far, the analysis did not consider geography. What is the reason for the century old divided world economy into core and periphery? In the middle of the 18th century China and India accounted for almost 57% of world manufacturing output. Till the edge of World War I their share eroded to 5% [Simmons, 1985, p. 600]. Based on Ricardo's trade theory most simple explanation focus on the effects of specialization in case of different modes of competition on agricultural markets and on manufactured goods markets. If productivity growth in manufacturing is concentrated on few countries and at the same time competition in agricultural products increase because of low productivity gains in an increasing number of countries which enter the world market, then the few countries will industrialize and the majority of countries will further de-industrialize because of the drop in agricultural prices. Whereas the former countries experience improving terms of trade, the latter suffer deteriorating terms of trade. If the innovative countries succeed in creating accumulation and productivity externalities within the industrial catching-up, then sustainable growth may very likely occur. Even between countries that are on the same level of industrialization uneven "innovative shocks" may result in relative de-industrialization of some countries. In the second half of the 19th century traditional handcrafted products from India were squeezed out of the world market by competing manufactured products from Britain which used new productivity increasing process technologies. The price of British manufactured exports fell dramatically. "Failing to keep up with the factory-based productivity growth achieved abroad, the Indian textile industry took the price hit, became less profitable, and de-industrialization ensued" [Williamson, 2004, p. 13]. In nowadays globalized world countries lagging behind in implementing innovative core technologies timely lose competitiveness in the manufacturing sector. World market shares melt away from all industries in countries which lag behind in applying general purpose technologies (GPT). Lagging behind might amongst others stem from relatively slow public investment in infrastructure which serves as enabler to introduce GPTs. Barriers to trade, investment and/or technology transfer are further reasons for losing industrial competitiveness.

In the long run the processes that led to industrialization respectively de-industrialization resulted in a dual world economy. The development paths seemed to be reinforced by lock-in effects. On the one side complex technologies, closely linked production processes and highly

specialized labor force protected the core countries for newcomers. On the other side the concentration of peripheral countries on the production and trade of few primary and/or low-skill products made them highly volatile; sustainable development processes could not be initiated by market mechanisms nor by government policies. Despite reservations from economists a number of studies suggest that the secular improvements in terms of trade in the core stabilized the positive trend of growth, whereas in the periphery the high volatility of the terms of trade restrained growth [Blattman, Hwang and Williamson, 2004]. The results of country-specific studies where the data base allows the aforementioned suggestions cannot be transferred one by one to all peripheral countries. The lack of long time series of data for peripheral countries in Europe, Asia and Latin America limits analytical studies. Observations and data based analysis of core and peripheral countries suggest the reversion of the former development paths. Most recently an intensive discussion arises about the effects of China's industrialization on core countries such as the USA, Germany, and Japan. The hypothesis that China's emergence will initiate de-industrialization processes in the core is based on the observation of the increasing activities of Western MNCs in and with China.

III. China's Industrialization: IFDI and Processing Trade

China's industrialization after Deng Xiaoping's economic reform has two characteristic features: firstly, concentration on labor-intensive manufacturing, and secondly, complementarity of trade and IFDI as the driving force. In 2010, China replaced for the first time the USA as the largest manufacturer accounting for almost 20% of the world production. Manufacturing contributed circa 35% to China's GDP which is two times higher than in countries with similar development level.¹ This sector developed to the dominant pillar of China's economic growth and economic transformation resulting in considerable increases in the world market shares in many manufacturing industries (table 2).

Since two decades China's share on the global FDI stock is increasing whereas the shares of USA, UK and Japan are decreasing. In 2010, China attracted US\$ 105.7 billion FDI, which ranked the country on the second place after the USA. More than 50% of the utilized foreign capital is invested in manufacturing (figure 3). Due to a stock of approximately US\$ 900 billion foreign investment, almost 60% of China's exports result from foreign invested enterprises. The share of state-owned enterprises decreased from 42% in 2001 to 18% in 2010. In the first half of the last decade processed products contributed approximately 56% to

¹ Depending on the definition of manufacturing, the share ranges between 35 and 44%.

China’s exports and 40% to its imports. In 2011, the share of exports (imports) by FIEs on China’s total exports (imports) accounted for 52% (49%) (MOFCOM, FDI Statistics).

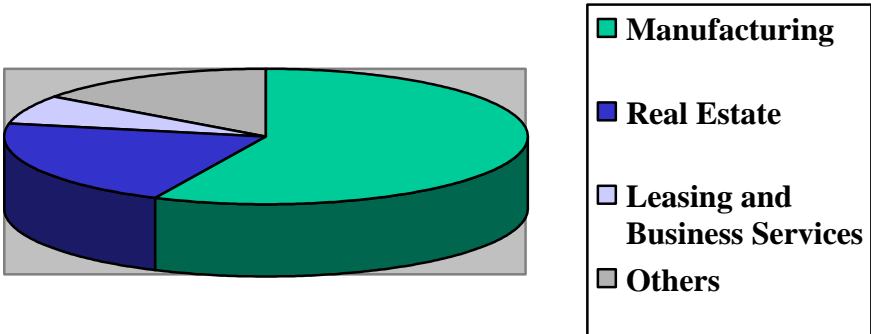
Without going into details, China’s industrialization could be characterized as a foreign venture in manufacturing (figure 4).

Table 2 RCA > 1 in Selected Industries, 2000 and 2009

| HS code | Product, tech. classification | World market share, 2009 | 2009 | | 2000 | |
|---------|---|--------------------------|------------------|--------|------------------|---------|
| | | | Rank (out of 44) | RCA | Rank (out of 47) | RCA |
| 46 | Manufacturers of plaiting material, basketwork (LT) | 71.2 | 1 | 8.0454 | 3 | 14.0000 |
| 66 | Umbrellas, walking sticks, seat sticks (LT) | 70.1 | 2 | 7.0228 | 1 | 15.0400 |
| 61 | Articles of apparel, accessories, knit or crochet | 33.7 | 7 | 3.8745 | 16 | 4.4900 |
| 64 | Footwear (LT) | 33.6 | 8 | 3.5945 | 9 | 6.0400 |
| 42 | Articles of leather, harness, travel goods (LT) | 35.3 | 10 | 3.3662 | 5 | 8.2800 |
| 95 | Toys, games, sports requisites (LT) | 32.4 | 11 | 3.3599 | 6 | 7.0200 |
| 94 | Furniture, lighting, signs | 27.0 | 15 | 2.6196 | 32 | 2.2400 |
| 85 | Electrical, electronic equipment (HT) | 18.4 | 25 | 1.9036 | 43 | 1.2200 |
| 86 | Railway, tramway locomotives (MT) | 11.2 | 43 | 1.0227 | 11 | 5.1300 |

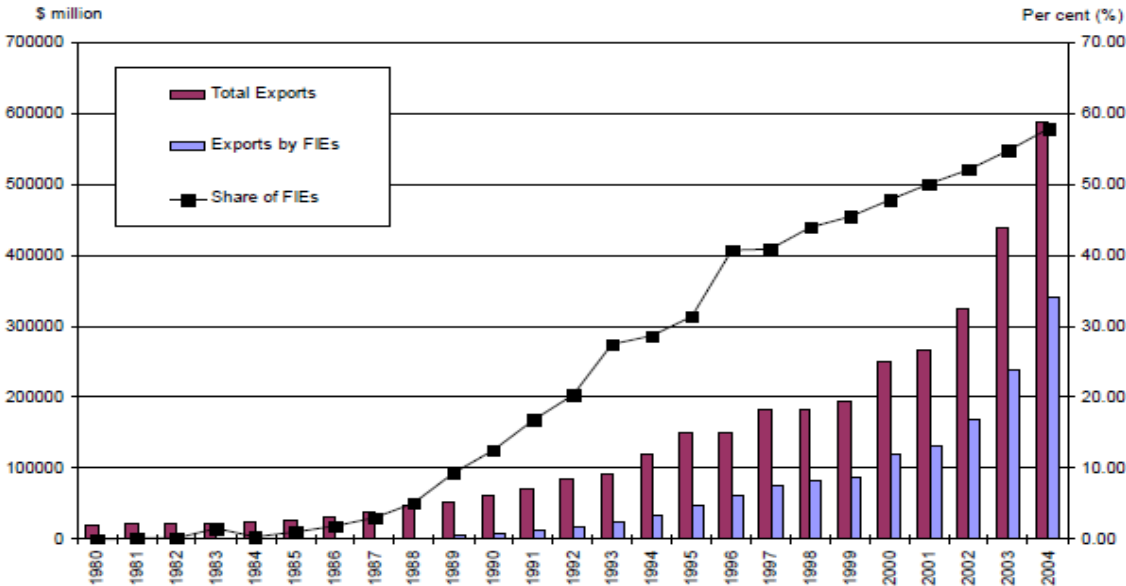
Source: Adams, Gangnes, Shachmurove, 2006, p. 109.

Figure 3 Foreign Direct Investment in China by Sectors, in %, 2010



Source: Own calculation on based on MOFCOM and National Bureau of Statistics.

Figure 4 Foreign Invested Enterprise (FIEs) and China’s Exports, 1980-2004



Sources: *China Statistical Yearbook 2004* (SSB, 2004) and *China Foreign Economic Statistical Yearbook 1979-2003* (SSB, 1979-2003). The data for 2004 are taken from the official website of China’s ministry of Commerce (<http://www.mofcom.gov.cn>).

Source: Source: Zhang, 2005, p. 12

IV. New Patterns of FDI and Trade? - Evidence from China, Germany, and Albania²

Germany

Between 1997 and 2007 German companies invested US\$ 12.4 billion in China. In 2011 China was ranked for the first time number one of German companies’ FDI outpacing German’s FDI in EU-15. The motivation is gradually changing from low-cost production of parts and components which are assembled in Germany to production of final goods for the domestic markets. Germany was the 8th important investor in China (MOFCOM, FDI Statistics). The widespread opinion that FDI results in job losses in the home country proved to be right for Germany’s labor-intensive industries, but could not be finally confirmed for medium- and high-tech industries. According to a 2011 published study of the German Chamber of Commerce and Industry the demand for workers is higher in companies that invest abroad than in the whole industry (DIHK, 2011). Germany’s industry is optimistic

² The presented collection of data in this section should deliver a sketchy overview on recent developments in trade and FDI. A detailed industry-specific, respectively product-specific data set is in preparation.

about the future of China as an attractive market, but is also aware of adapting the business model to gradually worsening cost situation with respect to local production costs in China.

Chinese companies are increasing their presence in Germany. More than 1.300 Chinese-funded enterprises set up branches in Germany. Several large M&As seem to strengthen Germany as a high-tech production location, thus maintaining its industrial base (Liu and Woywode, 2012).

After joining the EU, the first wave of German companies' FDI to Europe's periphery focused on Central and Eastern European countries (CEEC). The political and economic stabilization on the Balkan and several Agreements of the EU with countries in this region motivated German companies to significantly increase their investment in the Western Balkan. The Stabilization and Association Agreement with Albania which came into force in April 2009 and the almost simultaneous submission of Albania's application for EU membership set more favorable conditions for exploiting the potential as a near-shore production location. German companies' FDI more than quadrupled from 2005 to 2010 whereas FDI to China decreased by circa 35% (table 3). At first view there seems to be no significant FDI-trade nexus. Imports from Albania remain on a low level; exports to Albania show fluctuations that do not fit to the general pattern of Germany's exports. More than 50% of imports are textiles/clothes; nearly 30% of exports are cars (final and intermediate products) (table 4).

Table 3 Germany's FDI flows to China and Albania, 2000, 2005, 2010 (million Euro)

| | 2000 | 2005 | 2010 |
|---------|-------|---------|---------|
| China | 889,0 | 2.489,0 | 1.618,0 |
| Albania | 1,0 | 7,0 | 31,0 |

Source: OECD.StatExtracts.

Table 4 Germany's Trade with Albania, Euro million, 2007-2010

| | Total Imports | Clothes | Total Exports | Cars |
|------|----------------------|----------------|----------------------|-------------|
| 2007 | 36.6 | 51% | 144.4 | 29% |
| 2008 | 31.9 | | 193.7 | |
| 2009 | 35.2 | | 193.4 | |
| 2010 | 37.1 | | 154.3 | |

Source: Statistisches Bundesamt, 2011.

China

At first view, China's catching-up from low-tech exports to medium-tech and high-tech exports seem to strengthen its manufacturing sector. The share of final products in medium-tech and high-tech sectors is increasing and points into the same direction. But similar to the leading industrial countries the crucial point is the relation between domestically and foreign value-added. In the last decade, processing trade as a share of China's imports declined from 41.1% to 30.0% (RIETI, 2011). The growth of the active labor force is gradually slowing down thanks to the aging population. The relatively inflexible labor market leads to labor shortage in the centers of manufacturing. The remaining worker reservoir in rural areas does not meet the skill level of medium-tech and high-tech industries. Since several years the increase in real wages exceeds the real growth of the GDP. China's export driven growth which is based on low wage production of parts and components is fading away. The shift from low value-added to high value-added production stages requires an extensive adjustment within companies, industries and regions. Domestic and foreign companies might be forced to fragment their recently established fully integrated production processes and outsource labor-intensive processes. Domestic companies probably tend to establish production facilities in nearby low wage countries whereas foreign companies may consider to relocate parts of the production process to countries near their headquarters.

On the one hand, this change contributes to China's emergence from a developing to a developed country with a higher level of industrialization. On the other hand, the generally observed trend of a decreasing share of the industrial sector on the GDP in developed countries might be accelerated by efficiency-seeking OFDI. A detailed analysis of China's OFDI may deliver evidence for first signs of de-industrialization in manufacturing.

Albania

In principle, the access respectively availability of detailed industry-specific data with respect to trade and FDI is limited. The late opening-up of the country is one of the reasons why 20-30 years time series of data do hardly exist. Even time series of macroeconomic data such as GDP, M1, M2 are available from 1990 on only.

(It is planned to search for data in Albanian language by involving a researcher from at "Aleksandër Moisiu" University, Durrës.)

V. Hypothesis

General hypothesis:

1. Even in a closed economy de-industrialization – measured by the declining share of the industrial sector on the GDP – occurs after a mature level of industrialization – measured by growth of GDP per capita has been achieved.
2. In an open economy de-industrialization in manufacturing starts before the mature level of industrialization is achieved.

Specific hypothesis:

1. De-industrialization in China results from
 - a) gradually decreasing FDI inflows into the manufacturing sector especially from countries such as Germany,
 - b) gradually increasing FDI outflows from the manufacturing sector especially to peripheral countries in the region (Southeast Asia).
2. De-industrialization in China leads
 - a) to decreasing exports of intermediate products to developed countries such as Germany and
 - b) to increasing imports from peripheral countries in the region.
3. De-industrialization in China encourages FDI outflows in the manufacturing sector from European core countries such as Germany to European peripheral countries such as Albania and intensifies imports of intermediate products from the latter.
4. De-industrialization intensifies trade relations between China and European peripheral countries.

VI. Modeling Industrialization and De-industrialization

We consider a global economy characterized by a traded manufacturing industry and non traded services. The manufacturing sector is composed of a large number of producers organized in a monopolistic competitive environment, as in Helpman-Krugman, where the number of varieties is endogenously determined. We assume Dixit-Stiglitz [1977] preferences for manufacturing varieties, and a CES aggregator of the utility from services and manufacturing.

Consider a world economy composed of 2 nations. The home economy is populated by agents

whose utility at time i is $W_i = \sum_{t=1}^{\infty} \frac{U_t}{1+r}$

Where the period t utility is the aggregate of the utility from manufacturing and services

$$U_t = [M_t^\rho + S_t^\rho]^{1/\rho}$$

Following Baumol(1967) and Summers(1985), we assume that , Manufacturing is characterized by differentiated products, f which $m(m^*)$ varieties are aggregated according to the Dixit-Stigitz utility, $M_t = [\sum_{n=1}^{m+m^*} M_{t,n}^\theta]^{1/\theta}$, $0 \leq \theta \leq 1$

The preference structure is akin to Obstfeld and Rogoff [1996, section 4.4] and Spilimbergo [1998]. To simplify exposition we suppress henceforth the time index t. The production of services is given by $S = L_s$ where L_s workers are employed in services, which are assumed to be non-traded. The production of variety n at home requires both the periodic maintenance cost' C_t measured in labor units and the employment of labor time $M_n = \frac{L_n}{a}$

where L_n workers are employed in producing variety n , $1 \leq n \leq m$, and the constant a measures the marginal cost of manufacturing (in units of services). The foreign country is characterized by similar equations, where '*' denotes foreign values. We normalize the labor force in the home economy to 1, and in the foreign economy to h, and the price of services in the home economy to 1. The maximization problem facing the agent in the home economy is summarized by

$$\max_{\{M_n\}_{n=1}^{m+m^*}, S} \left[[M^\rho + S^\rho]^{1/\rho} + \lambda \left[\sum_{n=1}^{m+m^*} P_n M_n + S - 1 \right] \right], \text{ where } \lambda \text{ is the budget constraint's Lagrange}$$

multiplier. A similar problem applies to the foreign country

$$\max_{\{M_n^*\}_{n=1}^{m+m^*}, S^*} \left[[M^{*\rho} + S^{*\rho}]^{1/\rho} + \lambda^* \left[\sum_{n=1}^{m+m^*} P_n M_n^* + P_s^* S^* - h \right] \right]$$

Applying the first order conditions leads to (1), (2) and (3). These conditions can be solved for the home and foreign demand of a representative variety.

The demand for services is

$$S = \frac{1}{1 + P_m^\omega} \quad S^* = \frac{h}{1 + (P_m/P_s^*)^\omega} \quad \omega = \rho/(\rho-1) \quad 0 < \omega < 1 \quad (1)$$

The home and foreign demand of a representative variety is

$$M_v = \frac{1}{P_m + (P_m)^{1/(1-\rho)} \left(\frac{P_m}{P_v} \right)^\sigma} \quad (2)$$

$$M_v^* = \frac{h}{\frac{P_m}{P_s^*} + \left(\frac{P_m}{P_s^*} \right)^{1/(1-\rho)} \left(\frac{P_m}{P_v} \right)^\sigma}$$

Hence, the producer faces demand the elasticity of which is $\sigma = 1/(1-\theta)$

The term P_m is the Dixit-Stigitz manufacturing price index:

$$P_m = [m(P_v)^{-\theta\sigma} + m^*(P_v^*)^{-\theta\sigma}]^{-1/\sigma\theta} \quad (3)$$

where P_v, P_v^* are the prices of a representative variety in the home (foreign) economy, respectively.

The marginal costs of manufacturing at home and in the foreign country are

$$MC_v = a \quad MC_v^* = a^* P_s^* \quad (4)$$

Applying the properties of monopolistic competition it follows that $P_v = \frac{a}{\theta} \quad P_{v^*} = \frac{a^*}{\theta} P_s^*$ (5)

$$\text{Then } P_m = [m(\frac{a}{\theta})^{-\theta\sigma} + m^*(\frac{a^* P_s^*}{\theta})^{-\theta\sigma}]^{-1/\sigma\theta} \quad (3')$$

Free entry into manufacturing implies that gross profits equal the fixed cost

$$[M_v + M_v^*][P_v - MC_v] = C \quad (6)$$

$$[M_{v^*} + M_{v^*}^*][P_{v^*} - MC_{v^*}] = C^* P_s^*$$

Applying (2) (4) (5) to two equations in (6) , and then dividing the two resultant equation yields

$$\frac{P_s^*}{P_s} = \left(\frac{C}{C^*}\right)^{1-\theta} \left(\frac{a}{a^*}\right)^\theta \quad (7)$$

Full employment in both countries implies that

$$1 = S + [aM_v^s + C]m \quad (8)$$

$$h^* = S^* + [aM_{v^*}^{*s} + C^*]m^*$$

Where $M_v^s, M_{v^*}^{*s}$ is the supply of the represented variety in the home and the foreign economy, respectively.

Applying (4) and (5) to equations (6), we get

$$aM_v^s \left(\frac{1}{\theta} - 1\right) = C \quad a^* M_{v^*}^{*s} \left(\frac{1}{\theta} - 1\right) = C^* \quad (9)$$

Note that the manufacturing output in the home and the foreign economy is

$$mM_v^s P_v = mM_v^s \frac{a}{\theta} \quad m^* M_{v^*}^{*s} P_{v^*} = m^* M_{v^*}^{*s} \frac{a^*}{\theta} P_s^*$$

Then from (9) we infer that $mM_v^s P_v = mC\sigma$, $m^* M_{v^*}^{*s} P_{v^*} = m^* C^* \sigma P_s^*$ (10)

Substitute equations (9) into Full employment equation (8), we get

$$1 = S + mC\sigma \quad h = S^* + m^* C^* \sigma \quad (11)$$

Then substitute S and S with equation (1), we get

$$1 = \frac{mC}{1-\theta} [1 + \{P_m\}^{-\rho}] \quad h = \frac{m^* C^*}{1-\theta} \left[1 + \left(\frac{P_m}{P_s^*}\right)^{-\rho}\right] \quad (12)$$

Therefore equation (3'), (7), (10) form a simultaneous system of four equations in four endogenous variables $\square [m, m^*, P_m, P_s^*]$.

Next we show the GDP shares of manufacturing

$$\Phi^* = \frac{m^* M_{v^*}^{*s} P_{v^*}^*}{m^* M_{v^*}^{*s} P_{v^*}^* + S^* P_s^*} = \frac{1}{1 + \frac{S^* P_s^*}{m^* M_{v^*}^{*s} P_{v^*}^*}} = \frac{1}{1 + \frac{S^* \theta}{m^* \frac{C^* \theta}{a^* (1-\theta)}}} = \frac{1}{1 + \frac{S^* (1-\theta)}{m^* C^*}} \quad (13)$$

Applying (11) to (13) we get $\Phi^* = \frac{m^* C^*}{h(1-\theta)} = \frac{1}{1 + \left(\frac{P_m}{P_s^*}\right)^{-\omega}}$,

similarly we can get $\Phi = \frac{mC}{(1-\theta)} = \frac{1}{1 + (P_m)^{-\omega}}$

Suppose that the foreign country is less productive. We can apply our system to investigate the impact of a catching up process. Suppose that C^* , a^* drop at the same rate, that is

$$d \log[C^*] = d \log[a^*]$$

$$\frac{d \log m}{d \log a^*} = \frac{[1 - \tau^* \omega] \omega \tau \tau_p^*}{\sigma \theta + \omega[\tau \tau_p + \tau^* \tau_p^*]} > 0, \quad \frac{d \log m^*}{d \log a^*} = \frac{[1 - \tau^* \omega][\omega \tau \tau_p^* + \sigma \theta]}{\sigma \theta + \omega[\tau \tau_p + \tau^* \tau_p^*]} < 0$$

Where $\tau_p^*, \tau_p, \tau, \tau^*$ are shares bounded between zero and one, defined by

$$\tau_p = \frac{m \left(\frac{a}{\theta}\right)^{-\theta \sigma}}{m \left(\frac{a}{\theta}\right)^{-\theta \sigma} + m^* \left(\frac{a^* P_s^*}{\theta}\right)^{-\theta \sigma}}, \quad \tau_p^* = \frac{m \left(\frac{a^* P_s^*}{\theta}\right)^{-\theta \sigma}}{m \left(\frac{a}{\theta}\right)^{-\theta \sigma} + m^* \left(\frac{a^* P_s^*}{\theta}\right)^{-\theta \sigma}}$$

$$\tau = \frac{P_m^\omega}{1 + P_m^\omega} \quad \tau^* = \frac{(P_m/P_s^*)^\omega}{1 + (P_m/P_s^*)^\omega}$$

Hence, the catching up process leads to the de-industrialization of the high income countries.

It is noteworthy that, as long as the productivity growth rate of manufacturing exceeds that of services, the de-industrialization would have occurred even in the absence of international trade. Applying our model it can be verified that in autarky.

$$\frac{d \log \phi}{d \log a} = \frac{[1 - \tau] \omega \sigma}{\sigma \theta + \omega[1 - \tau]} > 0$$

$$\frac{d \log P_m}{d \log a} = \frac{\sigma}{\sigma \theta + \omega[1 - \tau]} > 0$$

Hence, technological improvements in manufacturing would reduce the relative price of manufacturing, increasing the GNP share of services independently of international trade.

Consequently, the catching-up of the emerging markets magnifies the de-industrialization process.

VII. The Case for China, Albania, and Germany³

De-industrialization has been the experience of a growing number of countries. China exhibits a strong surge in the manufacturing share in the aftermath of the liberalization during the

³ The first version of this paper includes for the time period 1990-2010 the following data of the three countries: GDP, GDP per capita, manufacturing (absolute and in % of GDP), M1, M2.

seventies, followed by a tenuous decline. Compared with Germany, China is relatively poor, but as the productivity and the GDP grows faster than most other countries, according to the model, we can infer it would lead to further de-industrialization of Germany and other developed countries, and at the meantime it is expected that when China's GDP per capita reaches a certain level (the turning point), its industrialization process may influence by some poor countries in the same way as how it influences Germany.

Table 5 summarizes the regression results for the case where the explanatory variables are the countries' relative GDP/capita (normalized by the Germany GDP/capita), the square of the countries' relative GDP/capita, and the financial depth and the exchange rate of RMB to US dollars. Our regression indicates that the manufacturing share reaches its peak when the China's GDP/capita reaches about 0.69 that of the Germany. In addition, we find that financial depth is associated with a lower manufacturing share.

| Table 5 Association between China's Manufacturing GDP Share, the Relative GDP per Capita and Financial Depth, Exchange Rate 1990-2010 | | | |
|--|-------------|----------|-------------|
| Variable | Coefficient | Std .Err | t-statistic |
| C | 0.37* | 0.015 | 24.53 |
| the relative GDP per capital between China and Germany | 0.43* | 0.15 | 2.94 |
| square the relative GDP per capital between China and Germany | -0.31* | 0.11 | -2.93 |
| M2/GDP | -0.05* | 0.02 | -2.29 |
| exchange | 0.0079* | 0.0021 | 3.84 |
| Adjust R-Square | | | 0.5 |

Note: Dependent variable is the manufacturing share as % of GDP, financial depth is money and quasi-money (M2) as a % of GDP. * represents statistically significant at the 1% level.

So, it is expected that when China's GDP per capita reaches a rich level, some peripheral countries in Europe like Albania which are relatively poor compared with China would set in motion a process that induces further de-industrialization of Germany, and the de-industrialization of China. And the regression result of table 6 shows that a 1% increase in Albania's GDP per capita with Germany as the benchmark will result in more than 1% increase in the manufacturing share of Albania. Thus, imagine if we take China and Germany as a whole, it is expected that as the productivity of manufacturing in Albania continues to enhance, its manufacturing share will continue to increase and the entrance of new low wage emerging markets like Albania to the global arena will account for the de-industrialization of both the semi-peripheral economies and the developed countries like China and Germany.

| Table 6 Association between Albania's Manufacturing GDP Share, the Relative GDP per Capita and Financial Depth, 1993-2010 | | | |
|--|-------------|----------|-------------|
| Variable | Coefficient | Std .Err | t-statistic |
| C | -2.1* | 0.47 | -4.47 |
| ln(the relative GDP per capital between Albania and Germany) | 1.006* | 0.32 | 3.13 |
| ln(M2/GDP) | -1.48* | 0.31 | -4.75 |
| Adjust R-Square | | | 0.55 |

Note: Dependent variable is Ln (the manufacturing share as % of GDP), Financial depth is money and quasi-money (M2) as a % of GDP. * represents statistically significant at the 1% level.

Preliminary Conclusion

Even if the result seems to confirm the basic hypothesis, it is without doubt a considerable work to do in testing it with more sophisticated models. Furthermore, a larger set of data needs to be explored. Especially the role of the cross-border transactions/operations has to be further elaborated. Future research should concentrate on the following questions: Firstly, does de-industrialization of the core stands automatically for the loss of the core status? Secondly, do industrializing emerging economies (semi-periphery) automatically move up to the core? Thirdly, do industrial late-comers keep their periphery status? Fourthly, which factors primarily determine the emergence of these late-comers?

References

- Adams, F.G., Gangnes, G., Shachmurove, Y. (2006). Why is China so Competitive? Measuring and Explaining China's Competitiveness. *The Authors. Journal Compilation @ 2006 Blackwell Publishing*, pp. 95-122.
- Aizenman, J. (2001). "De-industrialization and Emerging Market Economies". *Journal of Economic Development*, 26(1), 1-13.
- Baumol, W. (1967). "Macroeconomics of Unbalanced Growth: The Anatomy of Urban Crisis". *American Economic Review*, 76(5), 415-426.
- Baumol, W. Blackmand, S.A. and Wolf, E. (1989). *Productivity and American Leadership – The Long View*. Cambridge, MA: MIT Press.
- Black Sea Trade and Development Bank (2011). *Albania – Country Strategy 2011-2014*. Thessaloniki: BSTDB.
- Blattman, C., Hwang, J. and Williamson, J.G. (2004). "The Impact of the Terms of Trade on Economic Development in the Periphery, 1870-1939: Volatility and Secular Change". *NBER Working Paper*, 10600. Cambridge, MA: NBER.
- BME and Bogaschewsky, R. (eds.) (2009). *Einkaufen und Investieren in China*. Centrum für Supply Management.

- DIHK (2011). *Auslandinvestitionen in der Industrie – Frühjahr 2011*. Berlin: Deutscher Industrie- und Handelskammertag.
- Dixit, A.K. and Stiglitz, J.E. (1977). “Monopolistic Competition and Optimum Product Diversity”. *American Economic Review*, 67(3), 297-308.
- Fischer, W. (1985). “Wirtschaft und Gesellschaft Europas 1850–1914“. In: *Handbuch der Europäischen Wirtschafts- und Sozialgeschichte*, 5, pp 1–207. Stuttgart.
- Helpman, E. and Krugman, P. (1985). *Market Structure and Foreign Trade. Increasing Returns, Imperfect Competition, and the International Economy*. Cambridge, MA: MIT Press.
- Liu, Y. And Woywode, M. (2012). *Chinese M&A in Germany (2012)*. In: Alon, I., Fetcherin, A. and Gugler, P. (eds.), *Chinese International Investments*. London: Palgrave Macmillan.
- Maddison, A. (1964). *Economic Growth in the West*. New York.
- Obstfeld, M., and K. Rogoff (1996), *Foundations of International Macroeconomics*, Cambridge, MA and London: MIT Press.
- OECD (2005). *Trade and Structural Adjustment*. Paris.
- RIETI (2002). *China’s Industrialization and Japan’s De-industrialization*.
<http://www.rieti.go.jp/en/china/02101101.html>
- Samuelson, P.A. (1964). “Theoretical Notes on Trade Problems”. *Review of Economics and Statistics*, 46, 145-54.
- Simmons, C. (1985). “De-industrialization, Industrialization, and the Indian Economy 1850-1947”. *Modern Asian Studies*, 19(3), 593-622.
- Spilimbergo, A. (1998). “De-industrialization and Trade”. *Review of International Economics*, 6(3), 450-60.
- Statistisches Bundesamt (2011). *Aussenhandel, 2010*. Fachserie 7, Reihe 1. Wiesbaden.
- Summers, R. (1985).” *Services in International Economy*”. In: *Managing the Service Economy*, ed. by R. Inman, Cambridge: Cambridge University Press.
- Williamson, J.G. (2004).” *De-industrialization and Underdevelopment: A Comparative Assessment Around the Periphery 1750-1939*”. *Paper prepared for the Harvard Economic History Workshop*, December 17, 2004.
- Zhang, K.H. (2005). *How Does FDI Effect Host-Country’s Export Performance? The Case of China*. Paper presented at the conference “WTO, China, and the Asian Economies, III”, Xi’an University, June 25-26.