

The Role of Operating and Financial Leverage in Exports and Technological Development

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Abstract: The collapse of structured finance transactions led to financial constraints in the highly leveraged corporations and their banks due to the complexity of their embedded risks. The possibilities of sales increase or cost reduction at exporters have exhausted, as well. The appearance of need to introduce new technics and skills, as for AI and Industry 4.0 does not question the necessity for international technological and trade relations. The existence of financial and operating leverages is necessarily long-lasting and may change when complex technologies and closely interlinked systems keep spreading. Leverages have different impact on the owner of the technology as manufacturer or as supplier depending on the type of technology applied. That may encounter financial barriers, either. A basic issue whether is it possible to reconcile the consistency of capital allocation and financing that flawed attributed to the strengthening banking regulation following the set in of the “Great Financial Crisis” to serve the needs of implementation intensive technological change. System integration may increase financial risks and constrains to the availability of both short and long term financial facilities. To strengthen the capital basis and the liquidity both at banks and corporates is reasonable and inevitable because of the existence of leverages. All that predict increase in the level of lending rates and capital costs.

Keywords: operating and financial leverage, cost structure, volatility, technology, banking

1 Leverages and Crises

A major characteristic of the latest global crisis named Great Financial Recession (GFR) is that overlapping leverages appeared in several markets at the same time causing indebtedness. A huge portion of that still need to be settled. The question is whether the role and features of corporations’ leverages are long-lasting, what types of effects the start of new stream of technological development – Industry 4.0 – exercises on that and what basis for considerations the past can deliver.

1.1 Emergence of Leverages

There is always financial leverage when an entrepreneurship, financial institution, household or even a government uses external resources (borrowings) additional to its own funds for investments or because of already existing obligations to meet. The coexistence of operating and financial leverages at corporations is natural.

Cost items belong to either the variable or the fix category depending on their functions and both the operating and financial leverages are due to the existence of the fix ones. The degree of leverage is different by industries, applied technologies, market organizations and might be characteristic, too. Leverage signals the rate of risks, that are mainly individual, may be calculated at business level, can be expressed in money terms. Their financial consequence is direct and cannot be simply ignored.

1.1.1 The Types of Leverage and their Indicators

Most of the leverage ratios can be calculated directly from companies' public financial statements and may be aggregated.²⁷ They relate mainly to one feature marking the level of indebtedness through the costs and composition of funds.

The customary Degree of Operating Leverage (DOL) and Degree of Financial Leverage indicate elasticity and are adjusted to the needs of capital markets' operations. The DOL and DFL based on historical data and unchanged other conditions indicate the propensity to volatility, that means the expected risk and rate of elasticity. Their value is dependent from the actual level of production, too. The calculation is simple from corporate financial statements, though they are suitable only to come to indirect conclusions.²⁸

1.1.2 Crises and Leverage – Short Overview

Crises generally come together with the over indebtedness of some sector or the whole economy where and when the magnitude of leverage cannot be managed or can be only with difficulties. The price of risk, e.g. borrowing rate, insurance

²⁷ The relating literature is elaborated, almost every text-book contain variations, perhaps with smaller differences.

²⁸ The basis of these indicators is the EBIT (earnings before interest and taxes), three components of that include fix cost items, that contain essential differences in case of aggregations. If the proportion of fix items is increasing in time or in comparisons, the elasticity indicator, $DOL > 1$. The DFL reflects the elasticity through the $EPS/EBIT$, if the indicator > 1 , due to the leverage, the corporate risk for investors is growing, too

premium and – previously frequently – the rate of inflation tends to increase parallelly with the risk.²⁹

Numerous economic-financial crises concentrated on certain market or a segment of that, more on several countries or regions, and frequently only one currency. Globalized crises have occurred only in much smaller number.

During the recent crisis (GFR) started from 2005/2007 the consequences of reckless growth of leverages hit first the household – mortgage – loans, then together with the leverage problems of products containig complex risks tranmitted to the banks and the capital markets. This appeared in in the increased debt levels and the broken solvency of corporations. The role taken by the budgetary means and the monetary policies led rapidly to the debt crises of certain regions and countries which can be characterized as continuous leverage problems whose consequences have still be valid. The management of piled up massive debt remained unsolved for the time being and raise obstacles to growth, too.

Not rarely complicated, less transparent and poorly controlled technical, management or business structures of some companies or products concluded in excessive financial burdens, bankruptcies, and, technological risks included, ended with catastrophies.³⁰ Previously the technical risks had generally been localized, sometimes forgotten but led to such severe situations that generally cause financial collaps of business.

1.1.3 Analogy 1: Leverages at exporters

The large or trans-national exporter companies' operational leverage is generally higher than that of the companies with similar profile but active only in domestic market.

Due to the export, the number of units requiring specialized knowledge is bigger, coupled with higher wages of larger personnel that hardly can be tied to the sales volume of a product or in a market. They should cope with excess administration tasks. All that result in large general administration cost or continuously purchased service costs that increase the proportion and volume of fix cost items. This causes operating leverage to be shortly transformed into financial leverage, too, in the absence of capital increase with a continuously maintained high level of short term

²⁹ REINHART, C.M.- REINHART, V.R. (2015): Financial crises, development, and growth: A long-term perspective. *World Bank Economic Review*, (29), S53-S76. p.

³⁰ E.g. traditional or nuclear power stations, astronautical projects were complex systems, and declared being safe before the accident.

loans. Should the compensation of this excess obligation with cost saving fail, the result is lagging competitiveness or exit from the market.³¹

Short term financing and interim or more continuous financial needs of daughter companies or clause suppliers are frequently met by financial potential or possibilities of owners. In this case the financial leverage practically grows, but it doesn't appear as obligation towards banks.

The higher level of general or fix costs case financial constrains even crisis-less periods. The repeated financial difficulties of project companies or exporters that follow "niche strategy" date back to the beginning of the 2000's. That were caused most frequently the increased risk and refinancing costs because of highly over-than-average fix costs and volatile sales income pattern. With the consequent absence of development (investment), they generally were pushed out of the market or lost the independence of management and ownership.

There was continuous and rapid growth in global export from the 1990's, but the deterioration of competitiveness and productivity, increasing costs in most developed countries were due to the missing investment in technology and infrastructure. It was coupled with the FDI (foreign direct investment) to the developing countries in evenly increasing growth rate (WTO: World Trade Report, 2013).³² That was the beginning of the upheaval of offshoring and outsourcing activities initiated by the large exporters.

A further signal of the problem has emerged from about 2005 with the market difficulties of some strongly exporting-importing industries, like the automotive or the retail trade chains. Credit insurance covers were adjusted or even limited there to the credit risk of final exporter or buyer, irrespectively to the healthy creditworthiness of sub-suppliers.

As sales growth fell, the proportion of fix elements in the cost structure increased. The increasing leverage strengthened both the positive and negative effects even among low inflation and lending rates. All that directly contributed to the

³¹ This feature has been theoretically well based and verified on large corporate samples by the EFIGE researches, domestic reviews (Reszegi-Juhász, 2014) and significant banks (ECB). In the reported countries successful exporters operated with generally higher wages in the beginning of GFR, and after that in the successful countries together with the growing productivity.

³² Important results from different aspects appeared relating the industrialization that was followed by the creation of service sectors that partially took over the place of industries, called deindustrialization. For reference, look at analyses by Dadush, Uri or Rodrik, Dani, www.vox.eu.

decreasing competitiveness and bankruptcies of companies. It was expressed in the concentration of corporations and the banks, too.³³

1.1.4 Analogy 2: Minimizing the Leverages – in Global Frames

The regional and global supply chains continued and followed the scheme of exporters' endeavors. The basic purpose of supply chains that developed to global value chains soon was to drastically decrease all expenditures to the possible minimum. The setting up of local production facilities and infrastructure connected several types of services and extended to the expenditures on local management and administration, and later the „optimized” taxes by switching them into globally organized process and corporate structures. A significant part of the funds and expenditures for the necessary investments in fix assets was displaced out of the hub companies' balance sheets, too. The operating and taxed revenues, the dividend of the central corporation became maximized from economic and financial points of view, with the utilization of positive effects of the leverages.

The growth of the value of the merchandise export mainly from the developed countries reached the peak in 2008 then after an abrupt huge fall it reached the 2007 level again, quite soon. The increase of the volume of industrial output broke in 2010-11 and has been stagnating since then. The moderate pace of development in several developing countries has been preserved both in the production and trade, as well. The global trade volume, however, has stuck close to the trough in 2011.³⁴

This scheme and the problem had already come out before the crisis with the same consequences on the GVCs. The market and refinancing of buyers' solvency were shrinking, the clogged-up payments brought significant volatility of incomes to exporters, as well as all the chain, magnified by the leverage. The availability of funds became limited as risks of the concerned companies increased with the price of the risk, too. Corollary, the weight of the GVCs dropped strongly.³⁵ The

³³ BIS: CGFS Papers No 50.

³⁴ For basis supporting these statements I used data from CPB Netherlands Bureau for Economic Policy Analysis, CPB World Trade Monitor June 2016 és CPB World Trade Monitor March 2017

³⁵ Recently global firms concentrate their activity to the core business as redirecting their funds to locations with expected higher returns, even if the not preferred business was profitable. E.g. GE sold and quit branches in the financial sector, or CEE countries have been replaced with locations in Far-East in the telecommunication and ICT industries.

previous globalizing power fueling the exports has practically exhausted by about 2005. (see Economist, 2018)³⁶

1.1.5 Corporate leverages and the banks

Some of the central issues of the economic policy debates after 2008 were the improvement of corporate performance and financial institutions structural problems, the method of solution to the debt burdens with austerity measures or „growing out“. These questions haven't been answered properly yet. The urgent start of implementation of the Basel III – rules was aimed to serve efficient basis for maintaining the banking system's functions and improving its capabilities, but that piled up on the previous set of regulation just started functioning. Further credit supply was limited among others by the financial stability problems of countries in the EU and the Euro-zone, the structural problems of the single currency and the permanently high proportion of non- performing loans at certain banks and countries.

Since then, the evaluation of leverages to be handled by banks have become more granulated. E.g. Emter et al (2018) attribute much less importance to the impact of the Basel III rules on the deleveraging of banks and dismantling the NPL stock than previously stereotype opinions. However, some newly published results of empirical analyses on the correlation of demand on additional capital with the clients' debts generally justify the majority part of previous hypotheses (Gebauer et al, 2017; Gross et al, 2017; Smith et al, 2017).

Global data present that exporters are strongly exposed to the volatility of sales income from the aspects both of operational and financial leverages. In the case of production this impact is weaker and delayed, as opposed to the much lower volatility of services activities whose sales income was continuously increasing during the past 10-year period.³⁷

³⁶ This doesn't exclude technical or economic development, but companies should calculate with much lower ambitions. This possibility can be found in BCG, 2015 when they mention the technical possibility for consumer oriented, cheap, flexible production in small series.

³⁷ OECD: Trade in value-added: concepts, methodologies and challenges, (Joint OECD-WTO NOTE, 2012).

The World Bank (2017).: Global Value Change Report 2017,OECD: Cardiac Arrest or Dizzy Spell: Why is World Trade So Weak and What Can Policy Do About It? OECD Economic Paper, September 2016 No. 18)

2 Technology and Cost Structure

Although economic policies, the financial positions, and interests in the direction of the solution of problems were very different by countries in the EU, there were significant efforts made to elaborate a concept based on development and growth. That resulted in a series of studies to lay basis of the industrial policy communicated by the European Commission.³⁸ The next milestone became the aforementioned “Industry 4.0” by the BCG Group.

2.1 Structural elements

The concept is decisive in concentrating on the future high-tech developments. The timeframe for the gradual dissemination of Artificial Intelligence (AI) and ICT and the robotics in wide range of industries has been contemplated for 5-10 years together with its consequences on productivity. The limitation of loan-to-deposits ratios and the banks’ leverage, the necessary decrease of banks’ portfolios to achieve financial equilibrium are different from the developments’ needs. The actual low rate of inflation and low interest rates mean favorable conditions to investments, by principle, but that may change. The next problem is prevailing limited demand that relates to the potential low increase of real sales income, too. This means that the corporates’ and the banks’ positions can improve only by the decreasing costs, mainly fix costs – through investments, in accordance with the concept. The question is the proportion of favorable and hindering factors under the new conditions.

It is quite understandable, that the number of available data is limited and sporadic. With given this, it is possible to signal some predictable tendencies only. Those may occur in the fields below:

Change of the proportions of production, sales and services due to the integration and inclusion of AI-ICT and robotics into the processes.

Change of proportions of cost/expenditure items and their modification, including expenditures on cyber security and systems risk.

Potential change in the financial positions of corporations and banks concerning their leverages.³⁹

³⁸ A result of efforts was a volume of studies ([Barbiero et al.](#)); edited by [Veugelers, R.](#); BRUEGEL BLUEPRINT 21), that served as basis to the decision on the industrial development European Commission’s communication on industrial policy ([COM\(2012\) 582 final](#)), later a study based on contemporain approaches on industrial policy (Fontagné et al, 2014), or other research papers for significant fora, as WEF.

³⁹ For technical basis and support to this part the results and data in studies BCG Industry 4.0, and The World Bank: Global Value Chain Development Report 2017 were used.

2.2 Change of Technology and the Potential Effects

2.2.1 Proportion of Technology and Services

Characteristic change that a big portion of a previously purchased item, services become integrated into the process. The software content may partly increase the value of related fixed assets, but the larger effect is the transformation of a previously variable element to become permanent fix type cost. It is indifferent now, whether the service was imported or bought inland or both. The final effect is a question of price difference, but probably tends to increase the elasticity of indicators – the riskiness.

The new software content has an additional item. As its value can be high and the life cycle is shorter, that may lead to increase in depreciation, too. Here a new permanent expenditure item would increase the operating and financial leverages.

Some considerations: as usual, the measure of indicators (volatility, elasticity) are different by the volume of production, and the combination of fixed assets, software related, and the other variable costs generally may have unique structures.

The difference between the previous and expected expenditures may be significant by industries and companies. Depending on the complexity of systems, the operation in all cases requires higher and permanent expenditure. This way a significant portion of variable costs will be transformed into permanent fix item and cause the volatility and the leverage be higher than previously.

Altogether, the weight of fix cost items tends to grow and that of the variable ones decreases. The degree of leverage seems to increase in this bracket.

2.2.2 Change of Proportions and Character of Cost Elements

The new technology should inevitably be introduced in such functions that had not been outsourced or offshored, like R&D, complete lines of administration and partly the control, logistics, management e.c.t. Here lower wages would be transformed into higher additional costs of technical control, management, degree of education e.c.t. but the character of expenditures remains unchanged, the variable and permanent elements can be separately treated. The consequence is mainly an issue of the funding solutions and their costs.

Based on some published estimations decreasing in costs can be expected overwhelmingly in the fields of production, logistic, storing, assembly and control (technical, quality, but partly financial and administrative, as well). The increase in the productivity of the corporations in the review cause cost savings, that vary between 5-8% (with high volatility).

But big cut can be achieved on administration expenses with the replacement of labor with AI and necessary hardware. The reference of MNB (2017) contains an estimated 30% cost reduction at banks due to minimizing the administrative staff by introducing new technology. Similar result can be given at other service firms and in the high banking related administration costs of logistic and foreign trade. Research would be necessary to make estimation of several other types of cost savings, taking that the publications may be obsolete because of the time of the surveys. What is most missing now from cost vs. saving estimations is the highest rated risk of cyber security and cloud technics based on insurance surveys (Allianz Risk Report, 2017). These elements represent core of the Industry 4.0 concept.

The labor cost may have ambivalent effects. The lower bracket by education and wage predicts significant shrinking while the share of the higher bracket grows significantly parallelly with the technology change.

Altogether: the actual consideration of technological reform calculates with significant increase in productivity at company level based on highly developed technology investments. As this shift in the proportionality will be general, the increasing weight of fix elements will trigger larger than the basis volatility, leverage and consequently the risk and the costs of risk, and cost of capital, too. These effects can be compensated, provided all the cost saving stemming from the increased productivity would appear in the operating earnings (hopefully but not necessarily with growing sales income).

2.2.3 The change of financial positions

In this paragraph can be find mainly consequences stemming from the previously detailed features.

For start, there is an observation from a study on the correlation of corporate leverage with investments in five Euro-zone countries between 2005-2014. Gebauer et al (2017) did not find any threshold above that the leverage would have exerted significantly negative influence on investments.

This contradicts, however, the general observations and some statistics, too. So, some reservation and a detailed analysis of the panel of countries and companies before accepting such conclusions, e.g. on the regulation of the financial system.

As the new technology implemented in a wide array of companies, a significant part of expenditures on previously manual activities and administration with human interference will be transformed from current cost to fix ones. This may result in higher interest and debt amortization than in the past. The increasing amounts and proportions of fix items elevate the degree leverage and risk.

The effect of the reintegration of services and other activities into the business, the operation and organization, a need for additional capital investment in these activities appear again. If this is financed with debt, it raises the financial leverage

beside the operating one. The increased corporate risk should be accepted either by the banks or the investors in the capital markets, too.

The investment related issues above are closely linked to the regulation of banking and the capital market activities and institutions.

The increasing proportion of fixed assets in the operating process transform a significant portion of variable costs into lasting permanent expenditure, similarly to the problem of large exporters in funding their extensive current assets, although as opposed to the first one the latter process follows closely the production to sales cycle. This phenomenon is expected to push up additionally the demand for capital or long-term debt, partly because of the higher riskiness. This could induce increase in interest rates and yields.

The changing structure of customers' demand for financial services have direct influence on the financial sector, but taking Europe's next 5-10 years, the banking sector is still more exposed to changes. The higher demand for long term funds push banks to find adequate funding. But they should run the risks of growing degree of leverage of customers and the increasing concentration risk, their problems with the deleveraging of still existing low rated loans, and restructure the clientele, too. The deteriorating credit quality of companies may have the same effect on the banks and their access to funds. They should obey to the strict rules on their leverage ratios and adequate procedures. All in all credit rating will be as important for the customers as for the banks' investors, that's why they should be more selective in improving the quality of the portfolio. It is not clear yet, how the capital market can keep up with the potentially growing demand.

Conclusions

1 The existence of operating leverage in the corporate sector is natural and inevitable. The corporations' operating leverage is closely linked to the origination of their financial leverage, independently from the effects of financial cycles.

2 Difficulties of companies in fulfilling credit obligations are tightly connected to the increase of the degree of their financial leverage. The latter feature, however, cannot be fully attributed to the increasing severity of regulation of financial institutions.

3 The operating and financial leverages are higher at companies engaged in foreign trade or implement complex technological systems operating with larger technical risks due to the increasing proportion and measure of fix costs. This volatility appears together with the growth of leverages and risks. Should that trigger leverages in the banking system, those may raise limits to their financing activities and liquidity, too.

4 The foreseeable development in the technology brings system risks, including the cyber security. The companies' successful operation can be achieved by

counterbalancing the growing proportion of fix cost items and their continuous presence in markets only by permanent improvement of efficiency.

5 Several types of fix cost items had been offshored or outsourced through Global Value Chains, too. Now, a big portion of those is expected to be reintegrated into the core companies' activities and financial statements. As growing leverage (risk) is to cause increasing capital and yield requirements, under the prevailing rules further concentration in both the banking system and the capital markets is expected. Finally, all these may lead to higher interest rates, too.

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