

The Impact of Electronic Commerce on Economic Development – Assessment of Contribution to the Chinese Economic Growth from Alibaba Group

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Abstract: The aim of this study is to build and check the model to assess the impact of electronic trading platforms (ETP) on the economy development. In the focus are effects to small and medium-sized enterprises and international trade and the reasons for great value created by top companies of modern digital economy. The method is based on assessing increment to GDP through the total volume of goods sold - gross merchandise volume. The model is built and the minimization applied to the assessment of average contribution to economic growth in the Chinese economy from the Alibaba group in 2014-2019 years. As the result, the average direct contribution to GDP growth of China from the Alibaba group is assessed at about 1.1% per year.

1. Introduction

Evidently digital economy plays outstanding role in the modern post-industrial economy. The main vision of this was discussed in some academic monographs [1-4], a very few of scientific articles [5-7], some business articles and books [8-11] and many of international organizations reports [12-14]. However, the reasons for great value and the central role of digital economy are hardly touched upon in the scientific literature, while they are the subject of permanent discussions in the expert community. E.g. the report of the WTO 2017, “On the impact of electronic commerce on international trade” [15] contains an extensive qualitative analysis, but no theoretical models.

In the academic literature, one can also find examples of empirical research that impact in individual countries, but no models nor theory, except some general empirical considerations for global influence of Internet to economy (e.g. see Ayoub Yousefi [16]).

Although in the case of companies of the digital economy to identify their products is not always easy, their cash flows seem fantastic and their growth rates are even more fantastic - much higher than the growth rate of the economy as a whole. And the basic question – where all this digital fortune comes from is that one may call “the paradox of digital economy”. Some explains this effect by pure behaviouristic reason, referring on dot-com bubble at 2000-s.

But for a long time, we are seeing a real boom of digital economy IT: such giants as Microsoft, Alphabet (Google), Amazon, Facebook took the first line of the rating of the most valuable in the world. As company valuations are constantly changing, all the numbers and places are highly volatile. However, one point is stable: 5-7 top places are usually occupied by the companies with significant or prevailing share of digital economy. E.g. at 29/07/2019 the top 10 companies worth (in \$ bln., in the brackets annual change in %):

Microsoft 1,080.7 (+ 31.0%) Apple 955 (+ 9.8%), Amazon 941.6 (+ 5.2%), Alphabet 866.3 (0.9%), Facebook 559.0 (+ 12.0%), Berkshire Hathaway 515.0 (3.8%), Alibaba 460.9 (-6.5%), Visa 400.4 (+ 30.2%), JPMorgan Chase 375.8 (-0.2%), Johnson & Johnson 353.2 (+ 1.1%).

An objective assessment of the value of digital companies may be obtained on the basis of the expected cash flows with stochastic growth rate and stochastic discount rates, reflecting the constantly changing risk (see Zhukov P.E. [17]). The same methodology may be applied for traditional sector of economy with minimal or zero growth rates (see Zhukov P.E. [18]).

The main working hypothesis on how to resolve the paradox of digital economy, on the basis of the following facts is: in cases where the product of the digital company is not a specific service or

software product, one must assume that revenues largely are formed through the mediation function between customers and producers. For example, it may be contextual advertising using Big Data, like Google does, or e-trade like Alibaba and Amazon. And this mediation function may be followed with some other digital services that pleases customers.

The most obvious this function of the digital economy is manifested in the effect of ETP (electronic trading platforms), which form the core of the business, at least, two of the world's largest digital companies - Alibaba and Amazon. ETP are one of the most promising innovations for the digital economy and one of the most effective way to stimulate the development of economy and international trade. The greatest effect of the ETP manifest for small and medium-sized businesses, but also, they have a positive impact on big business by accelerating sales, the development of world trade and overall economic growth.

Key factor for impact of ETP on economy growth may by simplistically presented, as an effect of reducing the transaction costs associated with the search for buyers and sellers of goods and services. Example of Alibaba shows that the development of the ETP B2B (business to business) type could have revolutionary significance for the development of small and medium-sized businesses. Small and medium-sized businesses cannot afford such expenditures on advertising, marketing and branding, as big business. Therefore, the development of e-trade for small and midsize business means fundamentally new opportunities for access to markets, as well as to build horizontal linkages with other SMES (small and medium-sized enterprises).

Theoretically it is possible to distinguish two basic macroeconomic factors influence ETP on economic growth: reduce the costs of marketing and advertising and lowering transaction costs to search for contractors.

However, the most important for the real economy may have the other two factors of a microeconomic nature: the reduce in the prices of goods and services for consumers, the increase of sales for producers.

All these factors lead to increase in GDP and international trade.

The best method to assess the impact of ETP to economy development is to use increment to GDP through the total volume of goods sold - GMV (gross merchandise volume) – total value of trade performed through ETP.

The Chinese company Alibaba Group was chosen as example to assess the impact of ETP on the economy development. The company fist aim was to improve SMSE development, and international trade development. And the company is one of the top world digital company and the “icon” of China's economy, which development is one of the fastest in the world. Alibaba Group's influence on the development of China's economy and global trade has been widely discussed by the expert community, and numerous business articles, but in a very few of academic works.

2. Development of the Alibaba Group

By the nature of the business, the number of clients and the scope of activities the company Alibaba is similar to other digital company-Amazon from the United States, almost invariably included in the top-10 (although in their business and there are some differences) and is her rival (for comparison of Alibaba and Amazon see Erica Wong [19]). The main Alibaba ETP are: B2B- (Alibaba.com), C2C (Taobao) and B2C (Tmall). Alibaba became in 2006 the largest Chinese group ETP by number of customers, market share and profit. At March 2011, the number of participants exceeded 65 million from 240 countries.

At March 2019, company announced about 654 million active buyers (customers). Thus, for 9 years, the number of its users increased at around 10 times. By the year 2013 Alibaba has become the largest global company in this market, ahead of the United States largest companies in this field: E-bay and Amazon. Initially, Alibaba was created primarily to stimulate the development of, although today its value is much greater. There is no doubt that the success of Alibaba group comes because it firstly became very popular, and secondly, fulfilled the role of a powerful catalyst for the development of the Chinese economy. Indirectly one can get it from fundamentals of the group [20].

Alibaba Group's influence on the development of China's economy and global trade has been widely discussed by the expert community (see publication on the site, including Quora.com Erica Wong, on the role of Alibaba and Alibaba businesses and Amazon), but not in scientific works. To analyze the impact on the economy of China's Alibaba company most appropriate measure is GMV (gross merchandise volume) – total value of trade performed through its ETP.

Below in the table 1 are given numbers of China's GDP (in bln. \$) and GMV of Alibaba group [21] - for 2019 and 2020 data were forecasted.

Table 1 Gmv of Aliababa and China Gdp in Bln. \$

Year	GMV bln. \$	growth	GDP bln. \$	growth	GMV/GDP
2014	-	-	10439	7,30%	2,59%
2015	394	46%	11016	6,90%	3,58%
2016	485	27%	11138	6,70%	4,35%
2017	547	22%	12144	6,50%	4,50%
2018	768	28%	13608	6,60%	5,64%
2019	853	19%	14200	6,50%	6,01%
2020	1023,6	20%	15500	6,50%	6,60%

Assuming that transactions made through ETP of Alibaba group, would not be made without its mediation, one finds that its cumulative contribution to the growth of the Chinese economy is approximately 6% in annual terms to the year 2019. This is a tremendous contribution and that is a very conservative estimate as it does not take into account secondary effects.

Alibaba Group's contribution to the development of China's economy may be significantly higher, since it can be assumed that many small companies starting out on this ETP further could find permanent customers. Besides, in the group's income, some additional services provided to customers play an increasing part. So, Alibaba creates new services and on increasing scale. Although annual group's revenues from the commission grows, its share in total income has been declining steadily, from 18% at 31.03.2018 report to 16% at 31.03.2019 report, while revenue from commissions themselves have grown by 30%, and income by 39% (besides consolidated part).

3. Model to Assess Contribution of Alibaba Group to China's Economy

Consider the following model taking into account both primary and secondary effects:

$$\text{GDP}(t) = (1 + g(t)) \text{GDP}(t-1) + \text{GMV}(t) \quad (1)$$

$$\text{GMV}(t) = \alpha(t) \text{GMV}(t-1) + \beta(t) \text{GDP}(t) \quad (2)$$

Here $g(t)$ is GDP growth rate excluding effect of Alibaba, $\alpha(t)$ is the fraction of old business in GMV, and the $\beta(t)$ is the share of new business, created by ETP in GDP all in year t (all g , α and β is less than 1). To solve equations (1) and (2) on g , α and β is impossible without additional equations, as the number of variables is greater than the number of equations.

So, with some additional information one may add to (1), (2) another equation for g , α or β (for example, for $\alpha(t)$ which describes the share of permanent business in GMV). Another option is to use just given information from table 1 and to find the equilibrium values of g , α and β , which do not depend on t , and minimize an error on GDP and GMV (e.g., by generalized method of moments [22] or simply the least squares [23]). That way one can get the equilibrium evaluation of primary effect of Alibaba group, but eventually without regard to the additional business.

Next, suppose that g , α and β are constant and find equilibrium value, minimizing discrepancies in (1), (2) treated as the sum of the squares of the deviations. Substitute (1) into (2):

$$\text{GMV}(t) = \alpha \text{GMV}(t-1) + \beta ((1+g) \text{GDP}(t-1) + \text{GMV}(t))$$

Divide both sides by $\text{GDP}(t-1)$:

$$\text{GMV}(t)/\text{GDP}(t-1) = \alpha/(1-\beta) \text{GMV}(t-1)/\text{GDP}(t-1) + \beta (1 + g)/(1-\beta)$$

So that is the equation to determine the optimal parameters:

$$a = \beta (1 + g)/(1-\beta)$$

$$b = \alpha/(1-\beta)$$

Using for minimization data from table 1 one gets:

$$a = \beta(1+g)/(1-\beta) = 0.011$$

This is an average contribution of “Alibaba effect” to GDP growth of China (equal to 1.1% increase in growth). Second parameter is almost equal to 1 (statistical data are significant with 0,006 level and $R^2 = 0,87$):

$$b = \alpha/(1-\beta) = 1$$

The resulting first approximation model turns into simplified form:

$$GMV(t)/GDP(t-1) = GMV(t-1)/GDP(t-1) + \beta(1+g)/(1-\beta) \quad (3)$$

Here $GMV(t-1)/GDP(t-1)$ has the meaning of “Alibaba effect” to the China’s GDP at t-1 year, and $\beta(1+g)/(1-\beta)$ share of GDP growth of new businesses created newly at the year t by the “effect of Alibaba” (see table 2).

Table 2 Effect of Alibaba for the Annual Growth of China Gdp in %

Year	GMV bln. \$	growth	GDP bln. \$	growth	Effect of Alibaba
2014	-	-	10439	7,30%	1,19%
2015	394	46%	11016	6,90%	0,83%
2016	485	27%	11138	6,70%	0,56%
2017	547	22%	12144	6,50%	1,82%
2018	768	28%	13608	6,60%	0,62%
2019	853	19%	14200	6,50%	1,20%
2020	1023,6	20%	15500	6,50%	1,19%

4. Conclusions

The experience of Alibaba group ETP demonstrate how digital company business may have a very beneficial effect on the economy. Development of the ETP helps reduce transaction costs on marketing and advertising, as well as on the search for buyers and contractors. The result is a decline in the prices of goods and services for buyers that stimulates the growth of consumption.

Based on the available data, it can be assumed that the average contribution of Alibaba group in the growth of the Chinese economy was approximately 1.1% of GDP growth annually during 2014-2019 years. This corresponds to the direct effect of the GMV by Alibaba group but may not account for some secondary effects.

While continuing revenue growth and profit of the group rate above 30%. So, the development of e-trade has not yet reached the highest point of its rapid growth, after which one may assume steady growth rate 6-9%, similar to the average GDP growth of China’s economy.

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