

TRANSFER PRICING: EXAMINING THE GROSS MARGINS

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SYNOPSIS

In this research, we analyze the application of transfer pricing methods based on the comparison of gross profit margins. According to the theory, these methods are discarded due to functional differences, which are reflected in the intensity of costs in comparable companies, resulting in differences in gross margins. Therefore the theory suggests discarding the application of these methods when comparable enterprises are used. Our contribution consists on empirically evaluate if differences in costs intensity among comparable enterprises effectively result in gross margins differences. As a result, we found that in the wholesale and retail distribution sectors there is a positive and statistically significant impact of general costs on gross margins. Therefore, it is not advisable to use methods based on gross margins in these sectors.

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Transfer pricing (hereinafter TP) refer to the prices agreed between companies of a same economic group for the import and export of goods and services, as well as for loans and royalties. Taking into account that our country is characterized as a raw materials exporter country, this field turns to be an important control mechanism to verify the profits of the companies and the taxes to be paid by them.

From an economic concept stating that the role of prices to efficiently allocate resources, similarly the role of TP is to efficiently allocate resources within the company or economic group, where the conflicting interests existing in operations between independent third-parties are not present.

To use the market value for TP is the best alternative when there is a competitive market that provides a reference of the corresponding price or may be used as a perfect substitute for internal trade (Holmstrom and Tirole, 1991). In practice, it must be verified that transactions between related companies comply with the free competition principle (the arm's length principle)¹, which allows tax authorities to redefine the prices agreed upon in a transaction between related parties to the value or price that

would have been fixed between independent parties, in the same or similar conditions.

Accordingly, the Organization for Economic Cooperation and Development (hereinafter OECD) published for the first time in 1995, guidelines for TP. The TP methods were established in this document to assess whether operations between related companies have been held as if they were independent companies. The following methods were developed: Comparable Uncontrolled Price Method, the Resale Price Method; the Cost Plus Method, the Profit Split Method and the Transactional Net Margin Method.

In this paper we focus on further analyzing methods based on the gross profit, i.e. the Resale Price Method and the Cost Plus Method. These methods provide that if gross margins obtained in comparable transactions are similar to gross margins obtained between related companies we face a situation in which prices have been fair and without any advantages.

In a possible application of these methods, the analysis consists in comparing the gross margin of the enterprise under study and contrasting it with gross margins obtained by independent companies. In these cases the OECD guidelines suggest that functional differences reflected in general costs differences finally impact gross margins and therefore the comparison becomes not adequate or requires adjustments.

Our proposal is to make an empirical observation to prove the above statement. I.e. we will perform an empirical analysis to prove that when expenses intensity are higher, the gross margin is also higher and the use of comparable companies in the application of gross margins without considering this effect could lead to wrong results.

1. Principle according to which prices agreed upon in a transaction between related companies should correspond to the prices which would have been agreed upon in a transaction between non-related parties, in condition equal or similar to those of an open market.

For this project, we have taken financial information of companies from different economic sectors, including wholesale distribution, retail distribution, business services, manufacturing and mining. In addition, we have financial information for the companies from the year 1990 to 2011 and therefore we make an estimate using the fixed effects methodology by company.

The results show that in the wholesale distribution and retail distribution sectors, companies with greater expenses have a higher gross margin ²,

so it is not recommended to use the methods at a gross margin level. Similarly, business services and manufacturing sectors show a positive correlation between these variables, while the mining sector shows a negative correlation.

This work is divided in seven sections. Section 1 describes the motivation to develop this topic. Section 2 develops a literature review. Section 3 explains the methodology. Section 4 shows the used database. Results are explained in section 5 and finally, section 6 presents the conclusions.

1. MOTIVATION

Evidence shows that intra-group trade has permanently been increasing. Currently more than 30 per cent of the world trade takes place between related companies, so TP is becoming more important than ever³.

Similarly, TP are also important for taxpayers and tax administrations, because they determine to a large extent the income and expenses, and therefore the taxable profits of related companies in different tax jurisdiction⁴.

In this regard, it is worth mentioning that both the OECD guidelines and the United Nations TP Manual point out that special care is required to apply the TP methods at a gross margins level, due to differences in costs intensity between comparable companies. In some cases, it may be convenient to work at the operating margin level since the operating expenses variable is incorporated to the analysis⁵.

When the Cost plus and Resale Price methods are applied externally there are two reasons that can lead us to discard these methods. Namely, they are the accounting differences and the differences in expenses intensity.

In the case of not using the Cost Plus and Resale Price because of differences in expenses intensity, this is done because the differences in expenses intensity are supposed to affect the business gross margin.

In theory, and according to the OECD, companies with higher general expenses should be economically compensated with a higher gross margin. For example, higher costs in marketing and sales result in higher gross margins. Similarly, the recruitment of top managers and directors should result in a higher gross margin and greater efficiency in the business management.

2. Results show that the operating expense ratio is an explanatory variable of gross margin in these industries.

3. United Nations, "Practical Manual on Transfer Pricing for Developing Countries", United Nations New York (2013): Chapter 1, paragraph 1.1.3.

4. OECD Guidelines on transfer pricing for multinational enterprises and tax administrations (2010).

5. OCDE: chapter II, paragraph 2.27 y 2.28, United Nations, "Practical Manual on Transfer Pricing for Developing Countries", United Nations New York (2013): Chapter 6, paragraph 6.2.9.6.

The above description is economically reasonable and intuitive, but we have found no empirical evidence that sustains it.

Our work seeks to empirically validate if indeed enterprises with higher general and business

costs effectively have higher gross margins. If this is the case, there would be empirical evidence to discard the use of methods based on gross margins in their external version, or it would require a special treatment based on what we will find.

2. LITERATURE REVIEW

There is a broad theoretical and empirical framework in multinational companies TP literature. Hirshleifer (1956) presented the TP problem in the economy, stating that in competitive markets, the market value is the best reference to evaluate the internal transfer of products. If the market is not perfectly competitive or if the market for the product transfer does not exist, the correct TP would be the marginal cost. This way, firms choose between three approaches to assess their internal transactions: the negotiated price, the market value and the price based on costs⁶ (Eccles, 1985; Cravens, 1997).

In terms of economic research related to our current topic, the work done by Silva (1999) has been taken as reference. In this work, the

author assumes a positive relationship between intensity of expenses and the gross margin, and he proposes to perform an adjustment by functions using the ratio of operating expenses as an adjustment variable. Such an approach would be in line with some aspects of our work. Similarly, the work by Li and Ferreira (2007) was considered, in which the authors analyze the TP implications for the company from the point of view of the organization management literature.

Finally, the OECD Transfer Pricing Guidelines for multinational enterprises and tax administrations have been considered. It is worth mentioning that similar research to the one presented here has not been found, so this is a valuable contribution for implementing TP methods at a gross margin level.

3. METHODOLOGY

The regulation specifies two TP methods based on indicators at gross profit level: the Resale Price Method and the Cost Plus Method. In each case, compliance with the arm length principle is evaluated based on a single variable model, either sales or sales cost.

For the implementation of TP methods at the gross margins level, the following model could be used:

$$g_i = \alpha + E_i \quad (1)$$

for $i = 1, \dots, N$ comparables

Where g represents the margin of gross profit (gross margin on sales), α represents the mean or average of the gross profit margin, E represents the error associated with the comparable i -t, in addition $i = 1$ to N of comparable companies.

6. Previous empirical studies found that most companies apply variable of the market value and cost based methods to determine their transfer pricing. According to Ernst & Young (2011), from 39 to 44 percent of the surveyed companies adopt an approach based on the market value, while 30 to 36 per cent use an approach based on costs.

The error term has an expected value of zero and a constant variance.

By not incorporating the gross profit margin effects, this model produces results which are inconsistent with the regulation.

To solve this problem, we propose to include variable operating expense ratio in the model. According to the theoretical premise, the operating expenses ratio positively influences the obtained gross margin.

Then, we have the following model:

$$y_{i,t} = \alpha_i + \beta_1 x_{i,t} + \beta_2 \ln(\omega_{i,t}) + E_{i,t} \quad (2)$$

for $i = 1, \dots, N$ comparables

for $t = 1, \dots, T$ comparables

Where, y is the gross margin (gross profit between sales), x represents the ratio of operating expenses (Sales, General and administrative costs between net sales) and ω is the total assets of it comparable companies .⁷

In order to unify the analysis a gross margin ratio on sales has been created, without considering the applied method (resale price or Cost Plus). The conclusions should not be substantially affected by this simplification.

In the proposed model the explained variable is the gross margin, while the explanatory variable is the operating expenses ratio. In addition, a control variable is included which is the natural logarithm of total assets, this variable controls because it represents the size of the company. The estimate is performed using a panel data through the fixed effects methodology, which allowing controlling over time the unobservable variables.

4. DATABASE

In the present study we analyze companies in five economic sectors that we consider relevant in the global economic activity. It is an advantage to have available the financial information of companies in some databases, since the first OECD guidelines on TP did not have this information which allow performing tests at the empirical level.

A database that includes financial information for more than 65,000 companies in 110 countries was used, with historical information from 1979.

There are two TP methods at the gross margins levels according to the OECD and Peruvian law: the Resale price method and the Cost Plus method. Since the first is compatible with distribution operations, both retail and wholesale distribution companies were included in the

database. On the other hand, since the second is compatible with manufacturing operations, it was included in the textile manufacturing companies database.

As a result of our country position as raw materials exporter, we also considered companies in the mining sector, since most of the tax collection in our country is from mining activities, and therefore the result is important for the tax authority⁸. Finally, because of their importance in the world economy, business services companies were included. The selection of these economic sectors will allow us to observe operational differences between industries.

The companies were found through the Industrial Classification code (code SIC)⁹. This way, the five industries shown below were found:

7. In order to unify the analysis a gross margin ratio on sales has been created, without considering the applied method (resale price or Cost Plus). The conclusions should not be substantially affected by this simplification.
8. See Remezzano (2013).

Table 1
Industry according to SIC Code

Industry	From	Until
Metal Mining	1010	1099
Textile manufacturing	2200	2299
Pharmaceutical distribution	5120	5122
Car dealers	5500	5599
Advertising services	7311	7319

Finally, the information was from year 1990 to 2011 since it is considered reliable financial information. Similarly, it was considered appropriate to take the past 21 years since the full economic cycle with economic expansion and contraction periods can be observed.

Below are the statistics from the selected economic sectors companies.

Table 2
Statistics description
Distribution of pharmaceutical products

Variables	Observation	Mean	Standard dev.	Min	Max
Gross Profit Margin	185	.2913	.2748	.0165	.8670
Operational costs ratios	185	.2285	.2692	.0149	1.15
Assets (ln)	185	6.34	2.75	-.867	10.40
Car dealers	Observation	Mean	Standard dev.	Min	Max
Gross Profit Margin	376	.2679	.1595	.0090	.8016
Operational costs ratio	376	.2152	.1596	.0105	1.193
Assets (ln)	376	2.419	.9756	-.9507	4.689
Advertising services	Observation	Mean	Standard dev.	Min	Max
Gross Profit Margin	224	.4902	.2217	.0699	.9551
Operational costs ratio	224	.3389	.2974	.0469	2.55
Assets (ln)	224	6.22	2.22	1.63	10.55
Textile Manufacturing	Observation	Mean	Standard dev.	Min	Max
Gross Profit Margin	260	.2474	.0964	.0569	.4906
Operational costs ratio	260	.1542	.0737	.0268	.3024
Assets (ln)	260	5.64	1.44	1.73	9.06
Metal Mining	Observation	Mean	Standard dev.	Min	Max
Gross Profit Margin	429	.3699	.1788	.0039	1.0
Operational costs ratio	429	.2230	.5463	.0080	5.87
Assets (ln)	429	6.16	2.02	-.7031	10.79

9. The Standard Industrial Classification has been used for aggregation, collection, presentation, and analysis of the US economy. An industry consists of a group of establishments involved in the same production or group of products or similar services. SIC Codes are divided and subdivided into industries, allowing the quick location of the industry that include the activity or enterprise under analysis

4.1. Distribution of pharmaceutical products

This sector is responsible for the wholesale distribution of pharmaceutical products, which handles prescribed drugs and over the counter drugs.

4.2. Car dealers and gas stations services

The retail distribution is formed by companies that sale products for personal or family consumption, as well as the provision of services related to these sales.

We will analyze the car dealers and gas station service. This group includes the retail distribution of new and used vehicles as well as boats, SUVs and motorcycles. It also includes the sale of spare parts and services from gas stations.

4.3. Advertising services

The business services are companies providing advertising, credit report, data processing, computer programming, mail, reproduction services, among others.

In this work we analyze the advertising services section, which is divided into four groups. In the first group are advertising agencies, which produce printed documents, graphic arts and design for newspapers, magazines, radio and television. The second group is of external advertising agencies, including companies which design billboards, posters, among others. The third group is formed by representatives of advertising on radio and television. Finally, in the

fourth group are companies that provide different advertising services, which consist in distribution of flyers, advertising on transportation systems and aerial advertising.

4.4. Manufacture of textiles

The manufacturing section includes companies engaged in the mechanical or chemical transformation of materials or substances into new products. These are described as plants or factories.

The manufacture of textile includes the operation of preparing the fiber and manufacturing yarn, ropes and cables. Similarly, they include activities of dyeing and completion of fibers, as also the coating and waterproofing. Finally, the manufacture of apparel and other finished thread products is also included.

4.5. Metal Mining

This group includes companies engaged in the mining, mine development and exploration of metal. These minerals are extracted to be used as such or to form alloy, produce chemicals, among others. They include the processes of crushing, grounding, washing, drying, or mineral leaching. It also includes the separation by gravity or by floating.

Finally, in the Group of companies obtained through the SIC codes search; those that had insufficient financial information or were not active during the last five years of analysis were eliminated. Those showing a negative gross margin were also eliminated.

5. RESULTS

This section shows the results obtained in the performed estimate. The coefficients for each of the variables and the level of significance for each one of them is shown.

Table 3
Table of results: Impact of operative expenses on the gross margin ratio

Variables	D wholesale	D retail	Advertising	Manufacture	Mining
Operational expense ratio	.552*	.813***	.107	.412	-.038
	(.251)	(.178)	(.117)	(.353)	(.036)
Assets (ln)	.016	-.004	.023	.0003	.037***
	(.012)	(.011)	(.014)	(.010)	(.010)
Constant	.065	.124*	.309***	.181**	.15**
	(.094)	(.069)	(.091)	(.06)	(.063)
Observation	185	376	224	260	429
R-squared	.421	.475	.789	.113	.111

Notes: Robust standard errors are in parentheses.

***, ** and * represents significance at the 1, 5 and 10 percent, respectively. All regressions are due to effects fixed by company

As can be seen in the results table, the operating expenses ratio is a significant variable to explain the gross margin in two of the five economic sectors analyzed.

It is found that in the wholesale distribution industry the coefficient of the variable of interest is 0.552, which indicates that an increase of 27 per cent in the operating expenses ratio causes an increase of 43 per cent in the gross margin.

On the other hand, in the retail distribution sector the impact of operating expenses on gross margin is greater than in the wholesale distribution industry, since the coefficient found is 0.813. This means that, if the operating expense ratios increase by 16 percent, the gross margin will increase by 40 percent.

We also found that in the wholesale and retail distribution industries the coefficient is significant at 10 percent and 1 percent, respectively. A lower dispersion of observations is in the retail sector indicates a lower volatility.

In terms of production elasticity, it is observed that in the retail distribution sector the labor has a greater participation in the income reflected in the operating expenses than in the wholesale distribution sector.

Business services and manufacturing industries show a positive coefficient of the interest variable of 0.107 and 0.412, respectively. However, the results obtained in both industries are not significant at 10 percent, so robust conclusions with regard to the impact of operating expenses on gross margin cannot be obtained.

Finally, in the mining industry, the coefficient of the variable of interest is negative - 0.38 and is not significant at 10 percent. This result indicates that operating expenses do not explain the gross margin in the mining industry. In addition, there is a negative relationship between both variables. To interpret this result, we should consider that mining activities require high amounts of capital for their implementation and have a medium-term investment horizon. On the other hand, the price at which minerals are sold is very sensitive to global economic activity, in particular to the demand from China that has driven prices upward. However, China's growth has slowed

down in recent years, affecting considerably the prices. The level of assets is a significant variable to explain the gross margin in this sector.

Due to the results obtained, it can be concluded that in the manufacturing, mining and services industries there is no evidence at empirical level to discard the use of methods based on gross margins due to differences in expenses intensity. While for the wholesale and retail distribution sectors, methods that externally compare gross margins should be rejected, since the operating expenses are an explanatory variable of gross margin in these industries.

6. CONCLUSIONS

The conclusion of this work is that in the wholesale distribution and retail distribution sectors, the operating expenses ratio is an explanatory variable of the gross margin. Therefore there is empirical evidence to discard out the use of methods based on gross margins at external level in these sectors. A possibility in these cases would be using this method at the level of the operating margin, as the OECD suggests.

In the same way, we find that companies with higher general and commercial costs are economically balanced with higher gross margins, in the manufacturing, services and wholesale and retail distribution sectors. It is worth mentioning, that in the manufacturing and services sectors we find a positive relationship

between these variables, but not a significant relationship. In the same way, in the mining sector we find a negative relationship, but not an explanatory relationship of the level of operating expenses on gross margins.

Finally, it is observed that the theoretical assumption that indicates that higher level of operating expenses corresponds to a higher gross margin is not fulfilled in the mining sector. Obviously, assets are an important variable in this sector. A preliminary explanation could be that since these are commodities, international prices affect the gross margin, while operating costs respond to non-current factors of the company. This result, as well as the trends found for each industry, could be subject of further studies.

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