Effect of financial derivatives on the value of Latin American companies

Efecto de los derivados financieros en el valor de las empresas latinoamericanas

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Abstract

This paperwork has as goal to determine whether the decision to use financial derivatives or not has an effect on the value of organizations, as well as its behavior and magnitude within the business structure. For this, we had a sample of 60 companies that trade in ADRs and that belong to the countries of Argentina, Brazil, Chile, Colombia, Mexico and Peru. Three models were used based on the data panel for fixed effects, in which the independent variables: Tobin Q, RONA index and the Cash Flow, were taken for each of them, assuming that these indicators measure of somehow the value a company. The results showed consistency when establishing that the use of financial derivatives does not have a significant impact on their value, and on the contrary to what was thinking, they do not add value either. Regarding the strategies maintained in these portfolios by the companies, it was found that these are barely important within the corporate financial structure, and their results are questionable.

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Resumen

El presente artículo tiene como finalidad conocer si la decisión de usar o no derivado financieros tiene un efecto en el valor de las organizaciones, así como su comportamiento y magnitud dentro del esquema empresarial. Para ello, se dispuso de una muestra de 60 compañías que negocian en ADR's y que pertenecen a los países de Argentina, Brasil, Chile, Colombia, México y Perú. Se usaron 3 modelos basados en la metodología de panel de datos por efectos fijos, en los cuales se tomaron para cada uno de ellos las variables independientes: Q de Tobin, índice RONA y Flujo de Caja, al suponer que estos indicadores miden de una u otra manera el valor una compañía. Los resultados mostraron consistencia al establecer que, para la muestra seleccionada, el uso de los derivados financieros no tiene un impacto significativo en el valor de las mismas, y que, por el contrario, a lo pensado, tampoco agregan valor. En cuanto a las estrategias mantenidas en estos portafolios por parte de las compañías objeto de análisis, se encontró que pocas veces estas son importantes dentro de la estructura financiera empresarial, y que a la hora de la verdad sus resultados son cuestionables.

Código JEL: G14, G23, G32
Palabras clave: derivados financieros; valor de las empresas; RONA; Q de Tobin; flujo de caja

Introduction

In its early development, modern financial theory strongly undermined the need for organizations to have a risk management system. This idea, framed in the precepts of Modigliani and Miller (1958), undermined the use of strategies aimed at managing the risks that companies might face in a market since the assumption was that the latter was in the hands of optimally diversified investors operating within complete, efficient, and frictionless markets. Therefore, these investors would eliminate any problems through their portfolio choices (Cummins, Phillips, & Sthepen, 2001), thus causing the perception that any action an organization could take through risk management could be undertaken by the investor in advance (Bartram, Brown; & Conrad, 2011).

In more recent years, these theories have been giving way to a new theoretical framework where the practice of risk management has become increasingly important. It is considered that its support can increase the value of organizations by combating market imperfections, such as bankruptcy or financial stress costs, the tax effects of different tax programs, underinvestment problems, agency costs, and information asymmetries (Bartram, Brown, & Fehle, 2009). In this regard, authors such as Kozikowski (2007), Gay and Nam (1998), and Berkman and Bradbury (1996) mention that as long as these imperfections exist, the conjectures of Modigliani and Miller will not be fulfilled, and, therefore, measures against risks are feasible and could have a positive impact on organizations.

Therefore, agents have sought all kinds of guarantees to ensure the proper development of their operations to protect and maximize business value within markets that are far from perfect (Corzo & Balbi, 2007). For this purpose, they have used some mechanisms to help them manage their risks, including so-called financial derivatives—tools that have become common in recent years and are increasingly becoming a feature in global markets. These tools support companies navigating in environments of uncertainty and low predictability, thus leading to better management of the financial future (Place & Gray, 2003).

Although the above assumption has been taken as true, in the academic literature it is possible to find positions contrary to this idea; however, these are inconclusive since, due to the low number of studies carried out, no consensus has been reached.

Therefore, this article aims to help in the construction of a complete theoretical framework on the subject of financial derivatives and their effect on the value of companies, focusing on a Latin American market, using Tobin's Q, the RONA index, and Cash Flow as dependent variables in the models. Furthermore, it bases itself on the fact that the values of the net positions in derivatives and their results generated for each year are available. Thus, the model is given greater scope by not only depending on a dummy variable for derivatives but also on the amounts reported by the organizations in the sample regarding this issue.

This article consists of four sections, beginning with the state of the art as the reference and basis for this research, with a series of studies of the same type. The second and third sections detail the methodology used, the model constructed, and the analysis of the results. Finally, the fourth section presents some final considerations and recommendations for future research.

About some studies in the specialized literature

Research on financial derivatives and corporate value is not extensive; however, some publications can be found in several academic journals, which report different positions on the relationship between these variables. Some authors such as Allayannis and Weston (1998), Saito and Schiozer (2009), and Graham and Smith (1999) reaffirm the positive effect that strategies with financial derivatives have on the value of organizations. On the other hand, authors such as Guay and Kothari (2002) and Bartram, Conrad, and Brown (2001) do not find this relationship significant. Meanwhile, authors such as Jin and Jorion find a negative relationship in the same subject. Due to the variety of results, it seems important to present the positions and findings of some researchers to consolidate in one place the different positions found in the specialized literature.

Allayannis and Weston (1998) start from a sample of 720 large non-financial U.S. companies between 1990 and 1995 and find that those organizations that use foreign exchange financial derivatives tend to be more valuable than those that do not. On average, they observe an increase in value of about 4.87%, which translates to about $153 million. Graham and Rogers (2002) establish a positive relationship between the use of derivatives and debt capacity, resulting in an increase in corporate value of 1.1%, due to the tax benefits of having a higher financial debt and the reduction of earnings volatility, based on a sample of 3,232 companies that file a 10-K report with the U.S. Securities and Exchange Commission.

Guay and Kothari (2002) focus their research on 413 non-financial corporations trading their stocks in the U.S. market, evaluating the sensitivity of cash flow and the value of the derivatives portfolio to extreme changes in the prices of the underlying assets of the derivative portfolios held. They reveal that, as a result of this, positive impacts of about $15 million in cash flow, or $31 million in the value of the derivatives portfolio, can be generated. Despite this, they state that such amounts are small for these companies and are modest compared to all the risk exposures they have, covering in any case only 3% or 6% of these. They conclude their study by saying that financial derivatives are simply small adjustments to the risk programs of companies.

Regarding the results presented by Allayannis and Weston (1998) and Guay and Kothari (2002) state that such findings may raise doubts, suggesting that the increase in the value of the documented companies may be driven by other risk management activities, such as operational hedges, which positively correlate to the use of financial derivatives. In line with Guay and Kothari (2002), Brown (2001) reaches similar conclusions when evaluating the large multinational HDG Inc., finding that the use of financial derivatives has a limited effect on cash flow and that traditional risk management theories hardly explain why a company is motivated to use these instruments given the little impact they produce.

Saito and Schiozer (2009) examine a sample of 57 companies from Argentina, Brazil, Chile, and Mexico for 2004. Their study concludes that the use of financial derivatives to hedge foreign exchange risk is economically significant and can increase the value of a company between 3% and 7.6%. This is mainly because such tools can generate cash flows equivalent to 83.7% of financial expenses, 61.1% of capital expenditures (in the case of extreme changes in the value of the underlying assets), and 29.4% of earnings before interest and taxes. More recently, the same authors renewed their research, taking a sample of 55 companies from 2001 to 2004 (Schiozer & Saito, 2014), and still reached the same conclusions. However, this time, the percentages varied significantly, from 30% to 50% of financial expenses, more than 100% of capital expenses, and 8% to 40% of earnings before interest and taxes. It is important to clarify that they maintained the panel data methodology from one study to another.

These authors also find evidence that financial derivatives have a positive impact by reducing financial stress costs, mitigating underinvestment and asymmetric information problems, ensuring internal

cash generation, and increasing growth possibilities, thus validating the theories mentioned above, except for the case of tax reduction through the use of such instruments. Regarding this tax issue, Graham and Smith (1999) demonstrate that companies with convex tax programs can reduce tax burdens by almost 5.4% on average, reaching values close to 40% in extreme cases (under the U.S. tax regime), all thanks to the use of derivative instruments.

In their research, Saito and Schiozer (2009) state that their results differ substantially from those of Guay and Kothari (2002) because the interest rate and exchange volatilities are much larger in the countries under study, companies in this region seek a higher proportion of funds abroad in the absence of domestic funds, and the practice of hedging is more common, as well as more information being available in the chosen years.

As in the previous study, Jin and Jorion (2006) suggest that much research provides only indirect evidence of the relation between hedging and increased organizational value. They state that hedging does not always have a positive impact and argue that if risks are identifiable and easily protected by investors, the hedging premium tends to disappear thanks to diversification. Therefore, any strategy of this type will go against its objective and become unnecessary. They reached these conclusions after evaluating 119 companies belonging to the U.S. oil and gas industry, finding that companies that hedge are 4% less valuable than those that do not.

As a counterbalance, Cummins, Phillips, and Smith (2001) evaluate a sample of 1216 life insurance companies and 1668 property insurance companies that reported information to the U.S. National Association of Insurance Commissioners (NAIC) in 1994. Their study found that those insurers who hedged were more valuable than those who did not because they did not have to face financial distress costs, improve profitability efficiency, and reduce asset volatility, liquidity, and exchange rate risk.

Guay (1999) finds, for a sample of 254 U.S. non-financial corporations, that the initiation of a risk control program with financial derivatives can, within one year of its implementation, reduce around 5% of stock return volatility, 22% of interest exposure, and 11% of foreign exchange risk exposure for these companies. This contributes to their positive corporate governance and, therefore, to their being more appreciated in the market.

The study of Murillo, Chen, Yue, and Hong (2011) reinforces these positive results, providing information on 1185 companies and 2718 loan contracts subscribed to the U.S. market, finding that the use of hedging financial derivatives can help increase investment by 13%, reduce the cost of debt by 29%, and reduce capital restrictions by 20%. While this research does not determine a direct relationship between derivatives and enterprise value, it proposes a relationship between their cost and benefit, suggesting that, on average, hedging can yield net gains of 4.7% of annual income.

Meanwhile, Bartram, Conrad, and Brown (2011) support the argument that the use of derivatives does not significantly impact the value of companies, as established by other studies. However, their use does strongly reduce systematic risk, total risk, and volatility of flows. They draw on a sample of 6888 companies from 47 different countries to arrive at these deductions.

In the United Kingdom, Ahmed, Azevedo, and Guney (2013) consider a sample of 288 companies listed on the London Stock Exchange and divide their research by type of derivative (Forward, Futures, Options, and Swaps) and type of underlying assets (Exchange Rate, Interest Rate, and Commodities) in relation to measures of value such as ROIC, ROA, and Tobin's Q. In this way, they find that: the hedging of exchange rate risk for all types of derivatives is positive and significant regarding the performance and value of the company; the hedging of commodities is positive but not significant, except in the case of swaps, where even when positive it is significant; and the hedging of interest rate is negative and significant, except in the case of forwards, where the relationship is positively significant regarding the dependent variables.

Clark, Judgeb, and Ngaib (2006) validate the effect of using financial derivatives concerning corporate value for 227 organizations in Hong Kong and China. In their study, the authors find that hedging strategies in this part of the world increase corporate value by 0.88% (Hong Kong companies) and 0.56% (Chinese companies), all thanks to increased borrowing capacity and protection against financial distress costs.

In North America, using a sample of 92 gold mining companies, Tim and Chitru (2006) find that the use of financial derivatives enables the generation of significant cash flows in both upward and downward market periods, resulting in an appreciation of the value of the mines. On average, these mining companies generate $11 million in cash flow or $24 per ounce of gold hedged, plus a net income of $3.5 million. These figures are derived from risk premiums present in the gold market, the degree of hedging of the companies, and the managers' expectations regarding this commodity, given that the latter has a serious impact on hedged risk strategies (Brown & Crabb, 2002). Additionally, Tim and Chitru (2006) mention that for mining companies, the use of derivatives reduces gold price exposure by 54%, which goes against research such as that of Hentschel and Kothari (2001), who find little or no difference in the risk exposure or volatility faced by companies using or not using derivatives.

Sarmas (2005) provides a new perspective on the research on financial derivatives, evaluating the decision to hedge or not to hedge against economic booms and recessions. This author uses a sample of organizations that are part of the S&P 500 index during 1999 (boom period) and 2001 (downturn period) to this end. The findings demonstrate that companies that decided to hedge in both prosperous and adverse years present a higher value than their counterparts. The author emphasizes that these results are largely due to the tax benefits of hedging and the alleviation of distress costs.

Allayannis, Lel, and Miller (2012) integrate the concept of corporate governance into the analysis of financial derivatives and corporate value. They conclude that companies with stronger corporate governance in countries with greater concern and protectionism for investors tend to use more derivatives, increasing the value of such organizations thanks to reducing agency costs. A premium of 10.7% in the value of the companies is observed, a figure much higher than previous studies by Allayannis, which is due, in the words of the authors, to the fact that the sample of 372 companies is made up of economic agents from different parts of the world that have greater exposure to exchange rate risks. These findings are consistent with Fauver and Naranjo (2010), who examine a sample of 1746 companies headquartered in the United States, and state that the relationship between hedging derivatives and corporate value is negative when these companies have weak or seriously deficient corporate governance.

Deshmukh and Stephen (2005) study the impact of financial derivatives on cash flow for a sample of 312 companies operating in the U.S. market between 1992 and 1996. This research presents among its results a substantial reduction in cash flow volatility and in the costs associated with underinvestment for those companies that hedge relative to those that do not.

In Latin America, Coronas (2012) evaluates the possible effect of financial derivatives (both hedging and speculative) on the evolution of the stock prices of Mexican non-financial companies that are part of the calculation of the price and price index of the Mexican Stock Exchange (BMV). In this way and using a panel data methodology of fixed and random effects, the author finds that the use of financial derivatives has a positive and significant influence on the stock price values of the companies due to the reduction of the exposure to exchange rate risk.

Fierros Villanueva (2012), considering 69 BMV companies for the years from 2000 to 2011 and using panel data models, finds that risk management strategies with derivatives do not positively and significantly impact corporate value, which goes against the results of the previous study.

In Chile, Castillo and Moreno (2008) reach the same conclusions as Coronas (2012) and Fierros (2012), stating that Chilean companies are negatively affected in their value by the exchange rate risk to which they are exposed. In other words, with the implementation of hedging strategies with derivatives, this risk can be mitigated and positively impact the value of these organizations. The authors also clarify that the use of derivatives is one thing and the gross amount of the same is another, stating that, within the proposed model, the latter variable was not significant.

Also, in Chile, Cowan, Hansen, and Herrera (2006) indicate that foreign exchange derivatives are only a complement to risk management since, in Chilean companies, foreign debt is the most used as an exchange hedging mechanism. However, it has been declining in recent years. Likewise, they conclude that the use of derivatives relates significantly to the number of assets, debt, and income level in foreign currency.

In Brazil, Berrospide, Purnanandam, and Rajan (2008) find, considering a sample of 167 companies for the years 1997 to 2004, that companies that use currency-hedging financial derivatives are 6.7% to 7.8% more valuable than those that do not hedge. They argue that this premium is because these organizations increase their debt capacity, avoid facing bankruptcy or distress costs, protect their investment capital, and avoid underinvestment problems.

Lastly, in Colombia, Giraldo et al. (2017) analyze, through a fixed and random effects panel data model, a sample of 39 non-financial companies for the years 2008 to 2014 to observe whether the use of financial derivatives has an impact on their value (using Tobin's Q). In this way, they estimate that organizations that use derivatives increase their value a little more than 6.4% with respect to those that do not. They also find a positive relationship between total leverage, market capitalization, net profitability, and EBITDA margin in relation to corporate value.

As presented above, the studies carried out on financial derivatives have had mixed results. It is worth mentioning Dhanani, Fifield, Helliar, and Stevenson (2007), authors who state that the effect of hedging on corporate value may vary according to countries, tax regimes, regulatory impositions, and other conditions. There are also Scordis, Barrense, and Wang (2008), who state that the lack of empirical consensus among the studies done on the subject is not surprising given the mosaic of data that many studies collect, which in the end forces and limits the analyses, and makes it difficult to compare and generalize the results for companies or even for industries. According to the authors, this lack of consensus is highlighted by integrating into the analysis issues such as the disparity in financial culture between periods and regions of the world, a growing boom in the use of derivatives that did not exist before, technology that makes it possible to carry out transactions instantly and by a larger base of operators, the availability of better information as time goes by and, logically, the use of different assumptions or variables (which, even if they are the same, may have different forms of calculation). Different methodologies are not emphasized as calculations with panel data are preponderant in the literature reviewed.

As a hypothesis, the authors state that the use of a good financial derivatives strategy should provide companies with a premium in their value, either because of the benefits outlined at the beginning of this study or because of the simple fact of hedging their exposure to market variables, or because of the lower cost of using them compared to other hedging strategies (Geczy, Bernadette, & Schrand, 1997). Despite this, it is considered that these instruments are not a panacea but rather an integral part of any risk program and that these tools alone would not cover all of the risks existing in a company.

Methodology and modeling

Based on the research of Saito and Schiozer (2009), this study focused on the Latin American market, represented by Argentina, Brazil, Chile, Colombia, Mexico, and Peru, as these nations represent approximately 90% of the total financial market in the region. The sample took the organizations of the abovementioned countries that trade ADRs (American Depositary Receipts) on the main stock exchanges of the United States (NYSE and Nasdaq), excluding companies of the financial sector (banks, mutual investment funds, credit corporations, among others).

Specifically, the sample consisted of 60 organizations divided into 11 companies from Argentina, 23 from Brazil, 8 from Chile, 3 from Colombia, 12 from Mexico, and 3 from Peru. In turn, and according to their sector of origin, they are classified as follows: 13 companies from the consumer goods and retail sector, 7 from the mining sector, 8 from the airline sector, 5 from the construction sector, 2 from the public services sector, 4 from the oil and gas sector, 10 from the energy sector, 2 from the chemical sector, 2 from the agricultural sector, and 7 from the telecommunications sector.

As for these companies' financial and stock market information, this was mostly extracted from 20-K and 10-K reports filed with the Securities and Exchange Commission (SEC) of the United States for the years between 2013 and 2017. Likewise, financial, management, social responsibility, and earnings reports were considered, as well as presentations and audio recordings at international conventions, generally displayed on the investor websites of these companies. Finally, the Economatica software program was used to complete missing information or corroborate some important data, such as market capitalization and certain performance indices.

Regarding the methodological component, this research involved the use of econometric models using the panel data analysis method since its characteristics are more in line with how the sample is constructed (cross-sectional observations over time) and the benefits that this implies, among which are: providing a greater amount of informative data, more variability, less collinearity between variables, and more degrees of freedom, and explicitly considering the heterogeneity of the units. In conclusion, it is a more suitable methodology for studying the dynamics of change, measuring effects that could not be observed with purely cross-sectional or time-series data, and studying more complex behavioral models.

The resulting data panel is short and balanced as the number of companies far exceeds the number of years (short panel), and each of the companies has the same number of observations (balanced panel) (Gujarati & Porter, 2009).

The basis was the works of authors such as Castillo and Moreno (2008), Allayannis and Weston (1998), Jin and Jorion (2006), Guay and Kothari (2002), and Giraldo et al. (2017). Based on them, this study sought to build a model capable of understanding the relationship between and effect of financial

derivatives and corporate value, not only from its decisional component (the use or non-use of derivatives) and but also from the amount of the strategy of such contracts.

For this purpose, this study proposed three regression models that only changed in their dependent variable, in a style similar to that proposed by Ahmed, Azevedo, and Guney (2013), who use more than one dependent variable for their econometric models. Therefore, the proposal is to measure the value of companies through: Tobin's Q, a predominant variable in this type of studies and which measures the value of the companies based on market information; the RONA index, an internal variable that assumes the profit of a company from the use of its net assets; and cash flow, a variable that measures the cash generation capacity of an organization and which is used to estimate the value of companies in line with current valuation models.

Due to the type of selection and the sample, i.e., selection of individual cross-sectional units not drawn randomly and considering a sample that covers the total number of companies of interest (all Latin American companies listed on ADRs), and the subjects being concentrated in the same region of the world with similar characteristics, the authors decided to use a fixed-effects panel model rather than a random-effects panel. A dynamic panel was also not chosen since, when performing Arellano-Bond estimators, it was found that the main instrument, the lagged variable of interest, had no significance, and, in turn, this same quality is lost in some of the explanatory variables. It is also of note that the estimations were developed including robust errors, which avoids the possibility of heteroscedasticity. Regarding autocorrelation, panels with few years should not have significant problems concerning this issue (Woolridge, 2013). However, this is a characteristic of data in which the correlation between values of the same variables is based on related objects of interest, as in the case of this study (Snedecor & Cochran, 1989). Finally, the models were estimated using the dependent variables lagged one period as an instrument to minimize possible endogeneity problems.

It is worth highlighting that this research can be considered an extension of the study conducted by Saito and Schiozer (2014), although with notable differences, among which are:

- Colombia and Peru have been added to the sample.
- The study is conducted for the most recent years (2013 to 2017).
- The research does not focus on the determinants of financial derivatives, rather on their behavior and effect on corporate value—measured through several variables (Tobin's Q, RONA index, and Cash Flows).
- The research considers derivatives on all types of underlying assets (interest rate, currencies, commodities, stocks, stock indices, etc.) and purposes (hedging, speculation, and arbitrage).

- Information is available on the number of financial derivatives at fair value and the companies' net position in these instruments, which avoids making inferences through notional amounts or the statements of each of the agents in the sample.

Concerning the variables used in the model, the following independent and dependent variables were evaluated, especially based on the research already referred to in this section.

Independent variables:

- Company size (X1): This variable is measured as the natural logarithm of total assets.

- Profitability (X2): This variable is measured with ROA, a ratio defined as net income divided by total assets.

- Investment growth through fixed assets (X3): This variable is measured as property, plant, and equipment (net) divided by net income.

- Leverage (X4): This measure is defined as the total liabilities divided by equity.

- Taxes (X5): This item is measured as tax expense divided by net income.

- EBITDA margin (X6): This variable is measured as EBITDA divided by net revenues.

- Liquidity (X7): This variable is measured as KTO (Operating Working Capital) divided by current liabilities.

- KTNO Productivity (X8): This variable is quantified as KTNO (Net Operating Working Capital) divided by net income.

- Level of indebtedness (X9): This variable is measured as total liabilities divided by total assets.

- Financial indebtedness (X10): This variable is quantified as financial indebtedness divided by net income.

- Altman Z score (X11): Altman Z score is considered as a measure of financial stress.

- Effect of the derivative on the balance sheet (Δ): It is calculated as the value of the net position in derivatives at fair value (i.e., net asset or liability position on the balance sheet) divided by total assets. This provides a measure of the possible effect on the company's future finances when closing such contracts and thus on their value.

- Effect of the derivative on results (Φ): The result of the financial derivatives in the year can be either positive or negative, depending on how well the strategy was structured and whether the forecasts were met. This directly impacts the income statement of the company in the financial profit or loss section. With this in mind, this variable is measured as the profit or loss for the year divided by net income.

- Dummy derivatives (Ω): Dummy variable, 1 if the company used derivatives and 0 if not.

Of the 300 observations made (five for each company), 263 of them presented the use of financial derivatives, while 37 did not.

Dependent variables:

- Tobin's Q (Q): quantified as a financial ratio that measures the relationship between an organization's market value and its book value. Chung and Pruitt (1994) measure this variable as the sum of the market value of equity (or market capitalization) and the book value of total liabilities, divided by the book value of total assets. For Model 1, this dependent variable will be measured as the natural logarithm of Tobin's Q.

- RONA (RONA): measures how well a company uses its operating assets to generate profits. RONA is measured as Operating Income After Taxes (OIAT) divided by Net Operating Assets (NOA). For Model 2, this variable will be measured as the natural logarithm of RONA.

- Cash flow (CF): Based on ideas proposed by Deshmukh and Stephen (2005), cash flow is measured as the natural logarithm of the ratio of operating cash flow (OFC) divided by NOA. This assumes that the optimal use of net operating assets helps generate positive cash flows and, therefore, an appreciation of the company.

Table 1
Descriptive statistics

Variable		Mean	Std. Dev.	Min	Max
X1	Company Size	15.74	1.44	11.94	19.60
X2	Profitability	0.04	0.07	- 0.49	0.21
X3	Investment Growth	0.77	0.61	0.01	3.99
X4	Leverage	2.03	5.05	- 30.96	51.31
X5	Taxes	0.04	0.06	- 0.25	0.72
X6	EBITDA Margin	0.24	0.17	- 0.48	1.05
X7	Liquidity	1.30	1.05	0.17	8.75
X8	KTNO Productivity	0.25	0.25	- 0.33	1.85
X9	Level of Indebtedness	0.57	0.30	0.12	4.53
X10	Financial Indebtedness	0.57	0.45	-	3.08
X11	Altman Z Score	2.79	1.95	- 0.04	11.45
Δ	Effect of the Derivative on Balance Sheet	0.00	0.02	- 0.09	0.08
Φ	Effect of the Derivative on Results	-	0.02	- 0.19	0.21
Q	Tobin's Q	0.25	0.42	-0.95	1.63
RONA	RONA	0.99	0.94	-0.46	1.19
CF	Cash Flow	0.61	0.85	-0.64	0.70

Source: created by the author

Once this information was available, the proposed model was carried out as a multivariate estimation using the panel data methodology. This estimation, as mentioned above, consists of three

regressions with the same independent variables but with different dependent variables. Thus, the three proposed regressions are set out below:

$$\text{Log (Q)it} = \beta 1 + \beta 2 \text{ Xit} + \beta 3 \text{ }\Delta\text{it} + \beta 4 \text{ }\Phi\text{it} + \beta 5 \text{ }\Omega\text{it} + \alpha i + \mu it$$

$$(1)$$

$$\text{Log (RONA)it} = \beta 1 + \beta 2 \text{ Xit} + \beta 3 \text{ }\Delta\text{it} + \beta 4 \text{ }\Phi\text{it} + \beta 5 \text{ }\Omega\text{it} + \alpha i + \mu it$$

$$(2)$$

$$\text{Log (CF)it} = \beta 1 + \beta 2 \text{ Xit} + \beta 3 \text{ }\Delta\text{it} + \beta 4 \text{ }\Phi\text{it} + \beta 5 \text{ }\Omega\text{it} + \alpha i + \mu it$$

$$(3)$$

Where Q corresponds to Tobin's Q, RONA to return on net operating assets, CF to cash flow, X to control variables, Δ to the balance sheet effect of financial derivatives, Φ to the effect of the financial derivatives on the results for that year, Ω to the Dummy derivatives variable (1 if the company uses derivatives and 0 otherwise), α to the unobserved or heterogeneity effect, and μ to the error term.

The first of these models sought to measure the effect of financial derivatives on the company's value through a market measure. The second model did the same but through internal performance or profit. Finally, the third model proposed the same method, measured however through cash flow and the capacity of the company to generate it.

Results

Table 2 presents the results of the multivariate regressions described in the previous section (Tobi's Q, RONA, and CF). The third, fifth, and seventh columns of data (Coefficients) present the estimation of the Betas of the independent variables under panel by fixed effects. On the other hand, the fourth, sixth, and eighth columns of data are related to the significance of the variables through their P-value at 0.10.

In reviewing the results, several important facts emerge, among which, to the surprise of the authors, is the use of financial derivatives; in addition to not having a significant impact on the value of companies, it tends to be indirectly proportional to the latter since the relationship found between variables is negative. This leads to similar results found in the work of Jin and Jorion (2006) but for substantially different reasons. The latter state that the hedging premium tends to disappear in a market where risks are easily protected by investors thanks to diversification, and which ultimately makes hedging strategies useless. However, the authors of this article support the idea that these results are due to the immaturity of the Latin American market in this type of issue, the fear or lack of knowledge that certain agents may still have when establishing their portfolios, the limited infrastructure for carrying out these operations, the weakness of corporate governance in this region of the world, or simply the small size of the

transactions to be covered. There is no denying that most Latin American companies have very few or minimal operations abroad compared to those within their sphere of influence.

This is not to say that all Latin American companies can be evaluated according to this same standard. Most of them still have a long way to go to reach the size of organizations in other regions in terms of operations and resources. It is possible to see a market that is far from having perfect behavior, with deficiencies that are difficult to overcome in the short term and drastically slow down the companies' progress.

Table 2
Summary of results; Panel data model

R^2		Model 1: Tobin's Q		Model 2: RONA		Model 3: CF	
Within		0.5914		0.1662		0.1142	
Between		0.5152		0.0605		0.0124	
Overall		0.5301		0.0578		0.0176	
Variable		Coefficient	P>ItI	Coefficient	P>ItI	Coefficient	P>ItI
X1	Company size	-0.0360942	0.478	-0.9410156	0.002	-0.5996643	0.022
X2	Profitability	-0.0926276	0.673	-0.1875737	0.162	0.1698947	0.144
X3	Investment growth	-0.0505746	0.354	-0.5285786	0.097	-0.3868497	0.168
X4	Leverage	0.0015946	0.482	0.0145533	0.283	-0.0003505	0.976
X5	Taxes	0.1652514	0.359	0.2698358	0.799	0.1172933	0.901
X6	EBITDA margin	0.1071751	0.274	0.2249499	0.698	-0.4836993	0.344
X7	Liquidity	-0.0055923	0.796	-0.0138424	0.914	0.0011673	0.992
X8	KTNO Productivity	0.1170644	0.333	-0.1219408	0.091	-0.2446135	0.699
X9	Level of indebtedness	0.4344671	0.000	0.0439190	0.839	0.0195234	0.919
X10	Financial indebtedness	0.0574176	0.376	0.7273496	0.067	0.5356497	0.116
X11	Altman Z Score	0.1280245	0.000	0.1813201	0.079	0.0789249	0.386
Δ	Effect of the derivative on the balance sheet	0.0332190	0.968	0.2051233	0.671	0.6371804	0.140
Φ	Effect of the derivative on the results	-0.6100201	0.071	-0.2515038	0.206	0.1898205	0.288
Ω	Dummy derivative	-0.0239582	0.669	-0.0852330	0.797	-0.1088755	0.710
B	Constant	0.1558583	0.842	0.1206815	0.009	0.7399352	0.066
	Dependent variable (-1)	0.1643842	0.000	-0.2970590	0.000	-0.2345419	0.005

Source: created by the author

Regarding the other two variables on derivatives, it is found that the effect of the derivative strategy on both balance sheet and results tends not to be significant in any model. This quality could only be tested in the Tobin's Q model since the effect of the derivative on results was significant. Furthermore, the effect of the derivative on the balance sheet tends to be positive in the three models. At the same time, the results of the strategies used in the years in question were negative, except for the Cash Flow model, which would highlight the idea that the strategies in financial derivatives produce an increase in the companies' cash flow by reducing their volatility. In general, the above suggests that, although the results of the derivative strategies implemented by the organizations studied were not efficient in the years in

question, it is expected that in the future, when closing derivative contracts, they will tend to change course and that they will produce profits since there is a possibility that they will have a life beyond the short term.

The results described so far may seem somewhat contradictory because of such disparate deductions. However, as Castillo and Moreno (2008) state, using financial derivatives has not always been linked to a significant amount in these operations. The degree to which they are used is not the same as the mere decision of whether to use them or not, i.e., taking a position of one dollar is not the same as taking a position of a million dollars. Therefore, the basis of this article is the idea that only taking part or not in a derivative contract will not automatically generate a significant impact on value, which is because of the amount subscribed, and how they are structured and managed, which ultimately demonstrates their usefulness.

Regarding the control variables, the Altman Z Score and the level of indebtedness are positively significant for Tobin's Q model. Meanwhile, company size, investment growth, KTNO productivity, financial indebtedness, and the Altman Z Score are significant variables for the RONA model. The first three have a positive relationship and the others a negative one. Ultimately, significance is only found for the Cash Flow model in the company size variable, which has a negative relationship.

It is not surprising that the Altman Z Score positively relates to the value of a company since the higher this indicator is, the less likely it is that the organization will tend to go bankrupt or become insolvent. Thus, a company will appear more valuable the further away it is from an economic catastrophe. Similarly, a good degree of stable and healthy financial indebtedness will have a positive impact on how a company is perceived, not only for its visible financial soundness but also for its merits in lowering its weighted average cost of capital by having cheaper resources with third parties than those offered by the shareholders. Furthermore, there may be a situation that associates a higher level of debt with financing projects of positive net present value, which will ultimately have a favorable impact.

Regarding company size and investment growth and their entirely negative behavior, for the most part, it can be established that growth should not always be seen as a sign of improvement or financial robustness. Large size or irregular and excessive growth can lead to high levels of corporate bureaucracy that impede flexibility and efficiency in decisions, not to mention the high costs of maintaining such a structure (Allayannis, Lel, & Miler, 2012). Therefore, it is important to emphasize that there can be unsustainable growth, which in the long term implies significant sacrifices and goes against the basic financial principle.

Furthermore, the productivity variable of net operating working capital KTNO has a negative effect on the value of companies according to the RUNA and Cash Flow models. This may be because its

use by the organizations studied has not been the most appropriate, producing inefficiencies, and, therefore, these results within the models.

Although not significant for the three models presented, the variables taxes, leverage, EBITDA margin, profitability, and liquidity have demonstrated an average consistency. The first of these is positive in the three models, and the next two are positive for Tobin's Q and RONA models and negative for the Cash Flow model. The last two are negative for the first two models and positive for the third model.

It is worth highlighting from these results that the lower the tax burden a company faces, the more appropriate the tax shield, the more leveraged it is, and the more its EBITDA margin can cover and meet all of its obligations, the more valuable an organization will be, and individuals in the market will reward it with a premium on its amount or valuation. The profitability and liquidity variables tend to be negative in the models described, which cannot be understood theoretically. In the financial framework, any company with positive profitability or a good degree of liquidity should be more valuable than one without, where the generated profitability or liquidity is wasted and is not being used in projects that generate better results.

Table 3
Summary of performance and significance by model

Variable		Model 1: Tobin's Q		Model 2: RONA		Model 3: CF	
		Sign	Significance	Sign	Significance	Sign	Significance
X1	Company Size	-	NS	-	S	-	S
X2	Profitability	-	NS	-	NS	+	NS
X3	Investment Growth	-	NS	-	S	-	NS
X4	Leverage	+	NS	+	NS	-	NS
X5	Taxes	+	NS	+	NS	+	NS
X6	EBITDA Margin	+	NS	+	NS	-	NS
X7	Liquidity	-	NS	-	NS	+	NS
X8	KTNO Productivity	+	NS	-	S	-	NS
X9	Level of Indebtedness	+	S	+	NS	+	NS
X10	Financial Indebtedness	+	NS	+	S	+	NS
X11	Altman Z Score	+	S	+	S	+	NS
Δ	Effect of the Derivative on the Balance Sheet	+	NS	+	NS	+	NS
Φ	Effect of the Derivative on the Results	-	S	-	NS	+	NS
Ω	Dummy Derivative	-	NS	-	NS	-	NS

Source: created by the author

Conclusions

This work studies the effect of financial derivatives in six Latin American countries: Argentina, Brazil, Chile, Colombia, Mexico, and Peru. It uses a sample of 60 companies trading ADRs in the U.S. Market.

The sample data were collected from 20-F and 10-K reports of the Securities and Exchange Commission (SEC) and the quarterly, semi-annual, and annual reports, and presentations and audio recordings of international conferences, shared by each of the sampled companies on their official investor webpages. The Economatica software program was also used to collect other important market information or to validate certain data. The study covers the years from 2013 to 2017.

The estimation methodology was based on regressions using panel data, specifically fixed effects panel data. The dependent variables considered to measure the value of companies were Tobin's Q (measure of value through the market), RONA index (measure of value through performance), and Cash Flow (measure of value through cash generation capacity). The independent or explanatory variables were the following: company size, profitability, investment growth through fixed assets, leverage, taxes, EBITDA margin, liquidity, KTNO productivity, level of indebtedness, financial indebtedness, Altman Z score, the effect of the derivative on the balance sheet, the effect of the derivative on the results, and a dummy for the use of derivatives.

The data obtained in the three models (Tobin's Q, RONA, and Cash Flow) consistently establish that for the sample and the selected years, the use of financial derivatives and their degree in these contracts do not have a significant impact on the value of the same. They also establish that they may generate non-significant losses in value. However, the opposite is expected in the future, hence the paradox that for the models mentioned the effect of the derivatives on the result is negative with respect to the value, but that the effect of the derivative on the balance sheet is positive.

It is necessary to clarify that, although the dependent variables under study are slightly different, they share the fact that they are measures of value used throughout the world. Furthermore, in practice, they come together to provide a fuller perspective of the economic assets of an organization, Tobin's Q being the market perspective, and RONA and Cash Flow being a more internal perspective. Therefore, it should be emphasized that the results have demonstrated that even when looking at the issue of derivatives from different perspectives, one conclusion can be reached, which is none other than the aforementioned lack of impact of derivatives on corporate value. Among the explanations for this are: the immaturity and imperfection of the Latin American market regarding the niche of financial derivatives; the lack of knowledge on the part of these companies of the existing products or strategies that can be initiated with them; the human capital not skilled in these matters; the cost of building infrastructure to carry out these operations or hiring suitable high-impact personnel; the weakness of corporate governance or the lack of investor protection in this region of the world; problems of asymmetric information; fear of the complexity of these tools and the fact that misuse can lead to bankruptcy; or the lack of interest in using these tools because of the minimal transactions to cover.

It is worth highlighting that in Latin America, the subject of derivatives is not widely known or has a taboo connotation. For managers, it has the stigma of being complex, costly, or even dangerous. Therefore, it has not been so widely accepted and exploited in the regions studied.

In any case, the hypothesis proposed is rejected since it is evident that the significance is minimal and negative for the three models.

Finally, it is important to reinforce the marked tendency in the specialized literature to express the lack of consensus in empirical research or the lack of studies that go beyond those carried out so far. Therefore, it is important to stress the need to continue research on the subject of financial derivatives since the importance of the latter as a corporate strategy is increasing in a world with high levels of volatility. Consequently, the author proposes considering variables different from those analyzed here, making up a more heterogeneous set, where internal and external variables are present, such as market volatility, interest rates, exchange rates, dividend yield, KZ index, and WACC (cost of debt and equity), among others. Additionally, the author advocates using larger samples to develop this type of study in Latin America because this work and previous ones focus on a small percentage of the companies in countries where research is carried out. This also entails the challenge of a methodology that measures the value of companies not listed on the stock market, which are the majority and represent other characteristics of this type of region.

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