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Zarządzanie finansami firm – teoria i praktyka

Tom 1

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Zarządzanie finansami firm – teoria i praktyka ISSN 1899-3192

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FINANCIAL LEVERAGE PUZZLE – PRELIMINARY CONCLUSIONS FROM LITERATURE REVIEW

Summary: The paper reviews the way financial leverage concept is defined and used in books and research papers. More than 30 finance textbooks from Polish and foreign authors have been screened. In addition, over 100 finance and accounting papers recently published in the leading English finance and accounting journals have been analysed. Empirical research papers as well as the glossaries of textbooks tend to identify leverage with debt or indebtedness. In this approach, little attention is paid to the exact form of a capital structure ratio used. In addition, finance books debate leverage in many various chapters – every time viewing leverage differently. Single most surprising finding of the paper is a big difference between domestic and foreign attitude to DFL.

Keywords: leverage, debt, DFL, capital structure.

1. Introduction

In the recent paper *Ten Major Questions on Leverage* [Berent 2011b], the areas of most controversy surrounding the concept of *financial leverage* are debated. In particular, the paper starts with the following diagnosis:

"Financial leverage is a very popular topic among both practitioners and academics. (…) It features therefore not only in the literature on theory of finance but also in materials used in financial analysis and managerial accounting alike. This interdisciplinary nature of financial leverage is on one hand the source of its appeal but it is also the source of confusion. What may be regarded as pivotal in understanding financial leverage to a finance professor may be less appealing to an accounting expert. In my papers on financial leverage, I usually quote two authors, one Polish, one American, who diagnose the state of our knowledge on financial leverage surprisingly similar and this is despite the fact that their papers are published almost 50 years one from another. In short, the former calls the state of our understanding "conceptual chaos" [Żwirbla 2007], the other – "terminological confusion" [Dilbeck 1962]."

Then the paper goes on to formulate ten questions mentioned in the title, e.g. should leverage be conceived as a value neutral concept or not, phrased in market or

book terms, focused on risk or return, viewed ex post or ex ante, taking the perspective of total wealth or merely its increases, calculated with the help of elasticity or sensitivity analysis etc.

Our current paper under the title borrowed from the seminal work by Myers [1984] is an attempt to provide the introductory review of the leverage literature from both Polish and international perspective and by doing so to provide the first piece in the aforementioned puzzle. We look at several finance textbooks and manuals (section 2) as well as more than 100 papers published in recent years in leading English-language finance and accounting journals (section 3).

Given the "popularity" of *financial leverage* concept, the list is by no means exhaustive. Yet, even based on the material collected, we are able to formulate some important, although still preliminary, conclusions. Note the paper merely summarizes the literature rather than our view on the issue. Where necessary we also refer to our work.

2. Financial leverage in books

We have studied the treatment of financial leverage by more than 30 various finance textbooks and manuals: equally spread between English and Polish authors. Some books introduce leverage in the form of a verbal definition, others provide algebraic formulas. Some present the concept in the form of numerical examples and/or graphs, others neither define nor formally introduce leverage but simply use the word *leverage* in the text. Many authors provide more than one way in which they understand it, pointing explicitly to the differences in perspectives proposed. Another group introduces various approaches without a clear explanation of internal inconsistencies present in their exposition.

After some scrutiny of the proposals studied, we believe grouping various approaches to leverage into just five blocks is justified. Just like every attempt to provide a general classification is bound to be arbitrary with demarcation lines often blurred, the proposed distinction has a clear advantage in that it addresses head on the dilemmas present in the concept of leverage and hinted already in Berent's *Ten Questions on Leverage*. The five groups are as follows:

- leverage as capital structure,
- leverage as DFL (degree of financial leverage),
- leverage as the magnification of return levels,
- leverage as the magnification of risk,
- leverage as the impact on returns distribution.

2.1. Leverage as capital structure

Leverage in English is often taken to mean simply *debt* or *debt presence* in the capital structure. Below there are just few examples of how the glossaries attached to major finance textbooks define financial leverage: "The extent to which fixed-

income securities (debt and preferred-stock) are used in a firm's capital structure" [Ehrhardt and Brigham 2011, p. 779]; "The use of debt financing to complement equity financing" [Hawawini and Viallet, 2011, p. 621]; "The use of debt in a firm's capital structure" [Moles, Parrino and Kidwell 2011, p. 906]; "The amount of debt held in a portfolio or issued by a firm" [Berk and DeMarzo 2007, p. G-9]; "The proportion of debt capital in the overall capital structure" [Arnold 2002, p. 1046]; "Extent to which a firm relies on debt" [Ross, Westerfield and Jaffe, 1999, p. 859]. Dictionary definitions are almost identical: "The ratio of the long term funds with a fixed interest charge, such as debentures and preference shares, making up a company's capital to its ordinary share capital" [Butler 1997, p. 152]; "The relationship between the funds provided to a company by ordinary shareholders and the long-term funds with a fixed interest charge" [Hussey 1999, p. 176].

In almost all cases where leverage is treated as debt or indebtedness, it is measured by a capital structure ratio. However, there are three areas of potential disagreement in identifying leverage with the capital structure: i.e. the way debt is defined, valued and measured.

Almost all books offer the specific form of the capital structure ratio they believe most suitable. Debt ratio D/(D+E) [Ehrhardt and Brigham 2011; Hawawini and Viallet 2011; Moles, Parrino and Kidwell 2011; Brealey, Myers and Allen 2008; Hillier, Grinblatt and Titman 2008; Berk and DeMarzo 2007; Dębski 2005; Arnold 2002; Brigham and Gapenski 2000; Ross, Westerfield and Jordan 1999] is the most popular, among foreign authors in particular, followed by debt-to-equity ratio D/E [Ehrhardt and Brigham 2011; Hawawini and Viallet 2011; Moles, Parrino and Kidwell 2011; Brealey, Myers and Allen 2008; Grzywacz 2008; Duliniec 2007; Karpuś 2006; Szyszko i Szczepański 2003; Arnold 2002; Damodaran 2001; Duliniec 2001; Davies 1993]. An equity multiplier (D+E)/E is less frequently used [Hawawini and Viallet 2011; Moles, Parrino and Kidwell 2011; Grzywacz 2008; Duliniec 2007; Dębski 2005]. The proposals are not mutually exclusive so two or more different approaches may be used in one book.

Most authors believe leverage is about interest bearing liabilities [Hawawini and Viallet 2011; Brealey, Myers and Allen 2008; Duliniec 2007; Karpuś 2006; Dębski 2005; Keown, Martin, Petty and Scott 2005; Szyszko and Szczepański 2003; Gajdka 2002; Duliniec 2001; Wypych 1999; Davies 1993]. Only few allow non-interest bearing liability to play a part in the leverage story [Ehrhardt and Brigham 2011; Brealey, Myers and Allen 2008]. In most cases, however, interest bearing or non-interest bearing question is never mentioned.

What concerns the book vs. market value of debt issue, many authors accept both forms [Ehrhardt and Brigham 2011; Brealey, Myers and Allen 2008; Hillier, Grinblatt and Titman 2008; Arnold 2002; Duliniec 2001], although they may vary in the way they view the importance of the two. Some books do not address this issue at all.

Similarly, the issue of debt maturity is not raised by all which may imply that maturity is not important in the context of leverage. Ehrhardt and Brigham [2011], Hawawini and Viallet [2011], Brealey, Myers and Allen [2008], Berk and DeMarzo [2007], and Arnold [2002] use, for example, both short and long term debt. Brealey, Myers and Allen [2008] use only long term debt.

2.2. Leverage as DFL

The degree of financial leverage DFL is the ratio of relative changes in net and operating profit, EAT and EBIT respectively. Despite massive evidence of its shortcomings, DFL − due to the fact that it tends to be greater than 1, i.e. a 1% change in EBIT results in a more than proportional (leveraged) change in EAT − is still widely used as a leverage measure. The literature provides numerous versions of DFL that may be argued to fall into just two groups [Berent 2010]. The first one includes all versions collectively called dynamic, the other includes so called a static version. The former provides the elasticity interpretation, the latter, being the ratio of EBIT/(EBIT-INT), where INT denotes interest paid, does not but it is easy to calculate.

The measure seems particularly appealing to Polish authors. It is present, almost always in both the static and dynamic versions, in the work of Grzywacz [2008], Duliniec [2007], Rutkowski [2007], Karpuś [2006], Czekaj and Dresler [2005], Dębski [2005], Machała [2004], Szyszko and Szczepański [2003], Gajdka [2002], Duliniec [2001], Wilmowska and Wilmowski [2001], Wypych [1999]. Foreign authors rarely introduce the measure [Keown, Martin, Petty and Scott 2005]. Indirectly, or in the form of graphs or tables, DFL is also present in Hawawini and Viallet [2011], Moles, Parrino and Kidwell [2011] and Arnold [2002].

It is sometimes claimed that just like leverage measured by the capital structure ratio is branded *capital leverage*, the static version of DFL (only slightly reformulated) can be called *income leverage* [Arnold 2002]. This in turn makes many authors include coverage ratios as an income leverage measure too [Ehrhardt and Brigham 2011; Moles, Parrino and Kidwell 2011; Hillier, Grinblatt and Titman 2008]. After all, a typical coverage ratio EBIT/INT is a one-to-one function of DFL.

2.3. Leverage in returns

Yet another approach to leverage focuses on the fact that geared returns tend to be higher than ungeared ones. This can be illustrated by comparing ROE against ROIC [Ehrhardt and Brigham 2011; Hawawini and Viallet 2011; Subramanyam and Wild 2009; Bień 2008; Grzywacz 2008; Duliniec 2007; Dębski 2005; Szyszko and Szczepański 2003; Gajdka 2002] or by comparing ROE for the geared and ungeared firms [Berk and DeMarzo 2007; Duliniec 2007; Dębski 2005; Arnold 2002; Brigham and Gapenski 2000].

Unfortunately, like with DFL that is not always greater than 1, leverage credentials of this approach are uncertain. Most authors add the necessary condition for the geared returns to exceed the ungeared ones [e.g. Ehrhardt and Brigham 2011; Hawa-

wini and Viallet 2007; Subramanyam and Wild 2009; Bień 2008; Brealey, Myers and Allen 2008; Berk and DeMarzo 2007; Duliniec 2007; Karpuś 2006; Gajdka 2002; Brigham and Gapenski 2000].

The analysis of the required rate of return or the cost of capital that implicitly relates the geared returns to the ungeared ones can also be viewed as belonging to this approach [e.g. Ehrhardt and Brigham 2011; Hawawini and Viallet 2011; Moles, Parrino and Kidwell 2011; Berk and DeMarzo 2007; Arnold 2002].

2.4. Leverage in risk

Most authors identify financial leverage with financial risk, i.e. the magnification of risk that comes with debt and interest payment. Financial activity of the firm increases the variance of returns as well as returns beta. Most books, mainly foreign, emphasize the impact of leverage on the systematic risk increase too [e.g. Ehrhardt and Brigham 2011; Hawawini and Viallet 2011, Brealey, Myers and Allen 2008; Hillier, Grinblatt and Titman 2008; Berk and DeMarzo 2007; Damodaran 2001; Brigham and Gapenski 2000].

2.5. Leverage in the returns distribution

There are many authors who point to the changes in the whole distribution of returns, profits or EPS as quintessential to leverage [Karpuś 2006; Machała 2004; Arnold 2002; Damodaran 2001; Brigham and Gapenski 2000; Wypych 1999]. Leverage can be seen in the shift of the probability density function to the right that implies levered expected returns. The distribution has also got thicker tails, hence larger variance. Some use the coefficient of variation [Van Horne and Wachowicz 2005] as a measure of leverage derived from the distribution characteristics. Other ways to use the probability distribution in the context of leverage are also possible [Hawawini and Viallet 2011].

In Berent [2011a], a very general platform for the analysis of leverage based on the analysis of distribution is proposed. The paper includes the definition of financial leverage risk that emphasizes the role of leverage in increasing the probability of generating extreme (negative and/or positive) values of returns. The definition allows the user to decide the way how "extreme values" are understood. This in turn allows more specific definitions of financial leverage to be proposed. Berent argues that most definitions present in the literature can be successfully derived from his general approach.

3. Financial leverage in articles

The articles reviewed are those with *leverage* among their key words or those with a *leverage* word in either the title or the abstract. In the articles screened leverage features either as an independent variable, be it the main explanatory factor or a variable that corrects for "unwanted" influences, or simply as a variable being explained

by the model. We do not attempt to appraise the rationality of the models, nor do we intend to judge if the definitions and/or measure used are adequate given the nature of research undertaken. Our only objective is to register frequency with which various leverage measures are used. The counts may not add up to the total number of papers studied, nor percentages to 100%, as any paper could use more than one form of leverage measure or the criteria used do not allow an unambiguous category allocation. We have not detected any model in the sample that would for theoretical reasons imply any given form of leverage definition. We assume therefore that the form of leverage used is the arbitrary choice of the researcher.

3.1. Finance journals

We have managed to identify 92 finance articles published since 2000 in top three finance journals according to the Financial Times: the Journal of Finance, the Journal of Financial Economics and the Journal of Financial and Quantitative Analysis.[1] The first finding is that empirical research tends to identify leverage with capital structure: with debt ratio D/(D+E), used in 74% of papers, dominating the sample; 14% of articles use debt-to-equity D/E with other formulas such as (D+E)/E or E/D hardly represented in the sample. Every tenth paper uses a dummy variable to indicate the presence of debt. In some papers, the nominal value of debt is also used (Table 1).

Table 1. Leverage measure used in finance papers

Measure	Paper
(D+E)/E (74%)	Bae, Kang, Wang [2011] DeAngelo, DeAngelo, Whited [2011], He [2011], Chava, Purnanandam [2010], Francis, Hasan, John, Waisman [2010], Gao [2010], George, Hwang [2010], Ovtchinnikov [2010], Atanassov, Kim [2009], Avramov, Chordia, Jostova, Philipov [2009], Berkman, Dimitrov, Jain, Koch, Tice [2009], Chang, Dasgupta [2009], Chemmanur, Paeglis, Simonyan [2009], Harford, Klasa, Walcott [2009], Kisgen [2009], Leary [2009], Ovtchinnikov, McConnell [2009], Qiu, Yu [2009], Sibilkov [2009], Banerjee, Dasgupta, Kim [2008], Desai, Foley, Hines [2008], Francis, Hasan, Hunter [2008], Huizinga, Laeven, Nicodeme [2008], Lemmon, Roberts, Zender [2008], Morellec, Zhdanov [2008], Purnanandam [2008], Tserlukevich [2008], Tsyplakov [2008], Billett, Dolly King, Mauer [2007], Busaba, Benveniste, Strebulaev [2007], Hennessy, Whited [2007], Kale, Shahrur [2007], Marosi, Massoud [2007], Wald, Long [2007], Zhdanov [2007], Ahn, Denis, Denis [2006], Alti [2006], Campello [2006], Coles, Daniel, Naveen [2006], Flannery, Rangan [2006], Hackbarth, Miao, Morellec [2006], Hovakimian [2006], Lerner [2006], Lewellen [2006], Mitton [2006], Bates [2005], Childs, Mauer, Ott [2005], Datta, Iskandar-Datta, Raman [2005], Hennessy, Whited [2005], Ju, Parrino, Poteshman, Weisbach [2005], Kahle, Shastri [2005], Leary, Roberts [2005], Miao [2005], Molina [2005], Billett, Dolly King, Mauer [2004], Chan, Ikenberry, Lee [2004], Hovakimian, Hovakimian, Tehranian [2004], Frank, Goyal [2003], Giannetti [2003], Korajczyk, Levy [2003], Mao

[1] In its research rankings, the Financial Times uses 45 journals of which 4 are devoted to finance, 6 to accounting, (the last update as of December 31st, 2010).

Table 1. cont.

	[2003], Sun, Tong [2003], Dennis, Mayhew [2002], Goyal, Lehn, Racic [2002], Mansi Reeb [2002], Goyal, Lehn, Racic [2002], Busaba, Benveniste, Guo [2001], Peyer, Shivdasan [2001], Haushalter [2000].
D/E (14%)	Atanassov, Kim [2009], Hahn, Lee [2009], Lee, Ng, Swaminathan [2009], Livdan, Sapriza, Zhang [2009], Stein [2009], Avramov, Chordia, Jostova, Philipov [2007], Strebulaev [2007], Ju, Parrino, Poteshman, Weisbach [2005], Ferguson, Shockley [2003], Frank, Goyal [2003], Sun, Tong [2003], Novaes [2002], Collin-Dufresne, Goldstein [2001].
(D+E)/E (2%)	Gupta, Liang [2005], Ang, Chen [2002].
E/D (1%)	Duffie, Saita, Wang [2007].
D (10%)	Hennessy, Livdan [2009], Leary [2009], Banerjee, Dasgupta, Kim [2008], Brown, Goetzmann, Liang, Schwarz [2008], DeMarzo, Sannikov [2006], Cadenillas, Cvitani, Zapatero [2004], Bris, Koskinen [2002], Buraschi, Menini [2002], Eckbo, Masulis, Norli [2000].
dummy (5%)	Leary [2009], Banerjee, Dasgupta, Kim [2008], Brown, Goetzmann, Liang, Schwarz [2008], Chan, Ikenberry, Lee [2004], Haushalter [2000].

Source: own work.

This differs only slightly from the approach of the textbooks where the share of debt and debt-to-equity ratios is more evenly spread, with an equity multiplier, although least popular in textbooks too, used in more books than in papers.

As to debt maturity, in contrast to the books reviewed, the majority of articles take explicitly both long and short-term debt into account. Only 22% choose long-term debt (Table 2).

Table 2. Debt maturity in leverage measures in finance papers

Debt	Paper
1	2
long and short-term (70%)	He [2011], Chava, Purnanandam [2010], George, Hwang [2010], Ovtchinnikov [2010], Avramov, Chordia, Jostova, Philipov [2009], Berkman, Dimitrov, Jain, Koch, Tice [2009], Chang, Dasgupta [2009], Chemmanur, Paeglis, Simonyan [2009], Hahn, Lee [2009], Harford, Klasa, Walcott [2009], Hennessy, Livdan [2009], Kisgen [2009], Leary [2009], Lee, Ng, Swaminathan [2009], Livdan, Sapriza, Zhang [2009], Ovtchinnikov, McConnell [2009], Qiu, Yu [2009], Sibilkov [2009], Stein [2009], Desai, Foley, Hines [2008], Francis, Hasan, Hunter [2008], Huizinga, Laeven, Nicodeme [2008], Lemmon, Roberts, Zender [2008], Morellec, Zhdanov [2008], Purnanandam [2008], Tserlukevich [2008], Tsyplakov [2008], Avramov, Chordia, Jostova, Philipov [2007], Billett, Dolly King, Mauer [2007], Duffie, Saita, Wang [2007], Hennessy, Whited [2007], Kale, Shahrur [2007], Marosi, Massoud [2007], Strebulaev [2007], Wald, Long [2007] Zhdanov [2007], Ahn, Denis, Denis [2006], Alti [2006], Coles, Daniel, Naveen [2006], DeMarzo, Sannikov [2006], Flannery, Rangan [2006], Hackbarth, Miao, Morellec [2006], Hovakimian [2006], Lewellen [2006], Mitton [2006],Bates [2005], Hennessy, Whited [2005], Ju, Parrino, Poteshman, Weisbach [2005], Leary, Roberts [2005], Miao [2005], Molina [2005], Billett, Dolly King, Mauer [2004], Chan, Ikenberry, Lee [2004], Hovakimian, Hovakimian, Tehranian [2004], Ferguson, Shockley [2003], Frank, Goyal [2003], Giannetti [2003], Korajczyk, Levy [2003], Sun, Tong [2003], Buraschi, Menini [2002],Goyal, Lehn, Racic [2002], Novaes [2002], Peyer, Shivdasan [2001], Haushalter [2000].

1	2
long-term (22%)	Bae, Kang, Wang [2011], Francis, Hasan, John, Waisman [2010], Gao [2010], George, Hwang [2010], Atanassov, Kim [2009], Banerjee, Dasgupta, Kim [2008], Hennessy, Whited [2007], Marosi, Massoud [2007], Campello [2006], DeMarzo, Sannikov [2006], Flannery, Rangan [2006], Lerner [2006], Kahle, Shastri [2005], Raman [2005], Korajczyk, Levy [2003], Mao [2003], Sun, Tong [2003], Datta, Iskandar-Datta, Mansi, Reeb [2002], Dennis, Mayhew [2002], Collin-Dufresne, Goldstein [2001].

Source: own work.

What concerns market vs. book value, the former (including book value of debt treated as a market value estimator) accounts for 48% of all papers in the sample, the latter for 34%, with 25% of all the papers without any mention of the issue (Table 3).

Table 3. Market vs. book value of debt in finance papers

MV vs. BV	Paper
market value (48%)	Bae, Kang, Wang [2011], Chava, Purnanandam [2010], Ovtchinnikov [2010], Avramov, Chordia, Jostova, Philipov [2009], Hahn, Lee [2009], Harford, Klasa, Walcott [2009], Kisgen [2009], Leary [2009], Livdan, Sapriza, Zhang [2009], Banerjee, Dasgupta, Kim [2008], Lemmon, Roberts, Zender [2008], Morellec, Zhdanov [2008], Tserlukevich [2008], Tsyplakov [2008], Avramov, Chordia, Jostova, Philipov [2007], Billett, Dolly King, Mauer [2007], Hennessy, Whited [2007], Kale, Shahrur [2007], Strebulaev [2007], Wald, Long [2007], Zhdanov [2007], Ahn, Denis, Denis [2006], Coles, Daniel, Naveen [2006], Flannery, Rangan [2006], Hackbarth, Miao, Morellec [2006], Lerner [2006], Lewellen [2006], Childs, Mauer, Ott [2005], Datta, Iskandar-Datta, Raman [2005], Hennessy, Whited [2005], Ju, Parrino, Poteshman, Weisbach [2005], Kahle, Shastri [2005], Leary, Roberts [2005], Miao [2005], Molina [2005], Billett, Dolly King, Mauer [2004], Ferguson, Shockley [2003], Frank, Goyal [2003], Giannetti [2003], Korajczyk, Levy [2003], Dennis, Mayhew [2002], Goyal, Lehn, Racic [2002], Mansi, Reeb [2002], Haushalter [2000].
book value (34%)	Bae, Kang, Wang [2011], Chava, Purnanandam [2010], George, Hwang [2010], Ovtchinnikov [2010], Chang, Dasgupta [2009], Chemmanur, Paeglis, Simonyan [2009], Hahn, Lee [2009], Kisgen [2009], Leary [2009], Lee, Ng, Swaminathan [2009], Ovtchinnikov, McConnell [2009], Sibilkov [2009], Lemmon, Roberts, Zender [2008], Purnanandam [2008], Kale, Shahrur [2007], Wald, Long [2007], Ahn, Denis, Denis [2006], Alti [2006], Campello [2006], Coles, Daniel, Naveen [2006], Flannery, Rangan [2006], Lewellen [2006], Bates [2005], Kahle, Shastri [2005], Molina [2005], Frank, Goyal [2003], Korajczyk, Levy [2003], Mao [2003], Ang, Chen [2002], Goyal, Lehn, Racic [2002], Haushalter [2000].
no mention (25%)	DeAngelo, DeAngelo, Whited [2011], He [2011], Francis, Hasan, John, Waisman [2010], Gao [2010], Atanassov, Kim [2009], Berkman, Dimitrov, Jain, Koch, Tice [2009], Qiu, Yu [2009], Stein [2009], Desai, Foley, Hines [2008], Francis, Hasan, Hunter [2008], Huizinga, Laeven, Nicodeme [2008], Duffie, Saita, Wang [2007], Marosi, Massoud [2007], Hovakimian [2006], Mitton [2006], Gupta, Liang [2005], Chan, Ikenberry, Lee [2004], Hovakimian, Hovakimian, Tehranian [2004], Sun, Tong [2003], Novaes [2002], Busaba, Benveniste, Guo [2001], Collin-Dufresne, Goldstein [2001], Peyer, Shivdasan [2001].

Source: own work.

The fact that the issue of interest vs. non-interest bearing liability is explicitly raised only in few articles[2] may result from treating debt as interest bearing liability by default.

What may come as a surprise in comparison with the books screened is that in no paper at all DFL is used as a measure of financial leverage.

3.2. Accounting journals

Despite the fact that 5 accounting journals that feature in the Financial Times 45 Top Journals: i.e. Accounting Review, Contemporary Accounting Research, Journal of Accounting and Economics, Journal of Accounting Research, Review of Accounting Studies, have been screened for the presence of *leverage*, only 30 leverage papers published since 2000 have been found. As the accounting sample is chosen for comparison only, the sample size is regarded as sufficient.

In terms of the way leverage is measured, accounting papers are, just like in the case of finance articles, dominated by capital structure ratios with debt ratio D/(D+E) present in 70% of all accounting articles. A D/E ratio (27%) and a dummy variable approach (10%) are slightly more popular than in the case of the finance papers, with other measures hardly present. More importantly, even in the accounting articles, DFL, clearly an accounting based leverage measure, is not used by any single researcher.

Table 4. Leverage measures in accounting papers

Measure	Paper
1	2
D/(D+E) (70%)	Rajgopal, Venkatachalam [2011], Amir, Guan, Oswald [2010], Lisowsky [2010], Dechow, Shakespeare [2009], Hughes, Jing Liu, Jun Liu [2009], Johnston, Markov, Ramnath [2009], Ahmed, Duellman [2007], Demersand, Joos [2007], Hong, Sarkar [2007], Ortiz-Molina [2007], Dhaliwal, Heitzman, Zhenli [2006], Hay, Knechel, Wong [2006], Ball, Shivakumar [2005], Barton [2005], Millsand, Newberry [2005], Gordon, Joos [2004], Dichev, Skinner [2002] Gramlich, McAnally, Thomasi [2001], Wong, Wong [2001], Calegari [2000], D'Souza [2000].
D/E (27%)	Lui, Markov, Tamayo [2007], Penman, Richardson, Tuna [2007], Dhaliwal, Heitzman, Zhenli [2006], Ball, Shivakumar [2005], Hribar, Jenkins [2004], Nissim, Penman [2003], Rosett [2001], Calegari [2000].
(D+E)/E (3%)	Rosett [2001].
E/D (3%)	Hay, Knechel, Wong [2006].
dummy (10%)	Cassar, Gerakos [2010], Ortiz-Molina [2007], Millsand, Newberry [2005].
long and short-term (57%)	Dechow, Shakespeare [2009], Hughes, Jing Liu, Jun Liu [2009], Johnston, Markov, Ramnath [2009], Demersand, Joos [2007], Hong, Sarkar [2007], Lui, Markov, Tamayo [2007], Ortiz-Molina [2007], Penman, Richardson, Tuna [2007], Hay, Knechel, Wong [2006], Ball, Shivakumar [2005], Barton [2005], Gordon, Joos [2004], Hribar, Jenkins [2004], Nissim, Penman [2003], Dichev, Skinner [2002], Wong, Wong [2001], Calegari [2000].

[2] See [Kisgen 2009; Laeven i Nicodeme 2008; Flannery, Rangan 2006; Huizinga, Giannetti 2003; Morellec 2001].

long-term (37%)	Rajgopal, Venkatachalam [2011], Amir, Guan, Oswald [2010], Lisowsky [2010], Ahmed, Duellman [2007], Ortiz-Molina [2007], Dhaliwal, Heitzman, Zhenli [2006], Ball, Shivakumar [2005], Millsand, Newberry [2005], Gramlich, McAnally, Thomasi [2001], Calegari [2000], D'Souza [2000].
market value (20%)	Amir, Guan, Oswald [2010], Ortiz-Molina [2007], Penman, Richardson, Tuna [2007], Dhaliwal, Heitzman, Zhenli [2006], Calegari [2000], D'Souza [2000].
book value (20%)	Rajgopal, Venkatachalam [2011], Lui, Markov, Tamayo [2007], Ortiz-Molina [2007], Penman, Richardson, Tuna [2007], Dhaliwal, Heitzman, Zhenli [2006], Calegari [2000].
no mention (57%)	Lisowsky [2010], Dechow, Shakespeare [2009], Johnston, Markov, Ramnath [2009], Hughes, Jing Liu, Jun Liu [2009], Ahmed, Duellman [2007], Demersand, Joos [2007], Hong, Sarkar [2007], Hay, Knechel, Wong [2006], Ball, Shivakumar [2005], Barton [2005], Millsand, Newberry [2005], Gordon, Joos [2004], Hribar, Jenkins [2004], Dichev, Skinner [2002], Gramlich, McAnally, Thomasi [2001], Rosett [2001] Wong, Wong [2001].

Source: own work.

A long and short-term debt, grouped together, is used by more authors (57%) than long-term debt only (37%), although the gap between the two is not that big as it is in the finance papers case (70% vs. 22%). Understandably, far less focus is placed on market values (20%). Although the majority of papers (57%) say little about whether market or book value is chosen, one would expect the latter dominates accounting research (Table 4).

4. Conclusions

There are many different ways leverage is understood in finance literature with typical differences revolving around the characteristics of debt. Various opinions are voiced by books and articles authors on issues such as debt maturity (long vs. short term), valuation (book vs. market value), interest bearing vs. non interest bearing nature of debt etc. These and similar issues such as, say, leverage credentials of preferred stock or deferred taxes are all rather minor points in our opinion. What comes as really important from our literature review is presented below:

Conclusion 1. There are two distinct ways leverage is defined and measured in literature: it is associated with either the very presence of debt in a firm's capital structure or with the magnification effects this debt causes. To some leverage means the source of the magnification, to others − magnification itself. If we use the two perspectives in one sentence i.e. "*leverage* causes *leverage*" then this seemingly meaningless, or at least tautological statement, is true if properly understood. The first *leverage* is used to mean *debt* or *debt presence*, while the other *leverage* is used to mean *the magnification* of risk and/or return or anything else.

Conclusion 2. Viewed as the collection of the magnification effects, leverage is usually associated with simple levered effects, e.g. the increase in the variance and beta, the change in returns etc. These effects, deducible directly from theoretical models used, are the domain of manuals and textbooks. The other effects, usually much more sophisticated and not directly derivable from theoretical models, verified

a posteriori with the help of statistical tools, tend to be postulated by and described in research papers. These effects, rarely explicitly called leverage itself, can affect any aspect of business: e.g. investment policy, growth management, remuneration of directors, treatment of employees, buyer-supplier relationship etc.

Conclusion 3. Viewed simply as debt, leverage tends to be captured by a capital structure ratio. The glossaries of the finance books and manuals almost without an exception adopt precisely this approach. Similarly, whenever term *leverage* is used in empirical research articles, it is this approach that is adopted, again almost without an exception.

Conclusion 4. Even if debt ratio D/(D+E) dominates all sub-samples screened (textbooks, finance and accounting papers alike), there is little agreement what exact form the capital structure ratio should take to adequately measure leverage. However, various capital structure ratios are neither identical in terms of their mathematical properties nor they are the same in terms of their meaning, even though all different forms of capital structure ratios are one-to-one functions of each other.[3]

Conclusion 5. DFL is the only approach to leverage that can be interpreted as containing direct information on both debt taken and the effect of debt taking. In the former disguise, it is called income leverage and is calculated with the help of income statement inputs. In the latter disguise, it is simply the elasticity measure. This approach is widely used in manuals and textbooks and hardly present in empirical research. DFL itself seems particularly attractive to Polish authors, yet is not used by any empirical paper at all. This is perhaps single biggest difference between the perspective taken on leverage by domestic and foreign literature.

Conclusion 6. There is a surprisingly small difference in perspectives taken by finance and accounting research papers. In contrast to the approach taken by books, they all use leverage to mean debt (with accounting articles using more frequently book than market values). In addition, they almost unanimously make no use of DFL at all.

Conclusion 7. The books take a multifaceted approach. In glossary and introductory chapters, usually devoted to ratio analysis, they view leverage as debt. Many versions of leverage ratios are usually suggested. In chapters devoted to financial analysis, they tend to identify leverage with DFL or return magnification. In chapters on valuation and risk, they tend to treat leverage as the force affecting required rate of return and risk, mostly its systematic component

[3] As there is usually little theory to guide the empirical research, the choice of the capital structure ratio tends to be very arbitrary. This in turn may substantially affect the estimation process of the model parameters as well as the power of statistical tests used. It may invalidate the model altogether. For example, if the true population model is linear with respect to debt ratio D/(D+E), it cannot be linear with the respect to, say, D/E. A debt ratio D/(D+E), bordered by 0 and 1, seems to be a debt ratio per se. Yet an equity multiplier (D+E)/E, always greater than 1 for a geared firm, communicates a different story – it seems to be a clear leverage rather than debt ratio. The issue of the equivalence of various forms of capital structure ratios deserves a separate paper.

To summarize, *leverage* may mean different things to different people, it may even mean different things to one author when different parts of his work are studied.

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DŹWIGNIA FINANSOWA – WSTĘPNE WNIOSKI Z PRZEGLĄDU LITERATURY

Streszczenie: Artykuł podejmuje problematykę definicji i pomiaru dźwigni finansowej w literaturze przedmiotu. W tym celu przestudiowano zawartość ponad 30 polskich i anglojęzycznych monografii i podręczników akademickich. Przeanalizowano również ponad 100 artykułów naukowych opublikowanych w prestiżowych anglojęzycznych periodykach z dziedziny finansów i rachunkowości. Badania empiryczne, jak również słowniczki w pozycjach książkowych utożsamiają dźwignię finansową z zadłużeniem, mierząc ją którymś ze wskaźników zadłużenia. W ujęciu tym matematyczna postać wskaźnika wydaje się nie grać większej roli. Ponadto w monografiach i książkach dźwignia finansowa ujmowana jest na wiele sposobów, często opisujących efekty dźwigniowe. W odróżnieniu od literatury zagranicznej polscy autorzy wydają się utożsamiać dźwignię finansową z DFL.

Słowa kluczowe: dźwignia finansowa, dług, DFL, struktura kapitału.