

CASH - CASH FLOW SENSITIVITY: EVIDENCE FROM EMERGING MARKETS*

Res. Asst. Dr. Ömer Faruk TAN**

Prof. Dr. Emin AVCI***

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ABSTRACT

This study analyzes cash-cash flow sensitivity by comparing financially constrained and unconstrained firms in eight markets. 486 manufacturing firms are examined between 2005 and 2018 using the Generalized Method of Moments. These firms are categorized based on size, age, and Size-Age, Sales-Age, and Kaplan and Zingales indices. We find that both constrained and unconstrained firms evince positive cash-cash flow sensitivity. Although unconstrained firms obtain external financing easily, they prefer to first use internally generated funds in accordance with the pecking order theory. The results also reveal that cash-cash flow sensitivity cannot be used to test financial constraints in emerging markets.

Keywords: Cash-cash flow sensitivity, cash holding, emerging markets, GMM

JEL Classification: G30, G32, C33

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** Marmara University, Faculty of Business Administration, Department of Accounting and Finance, omer.tan@marmara.edu.tr, orcid.org/0000-0002-8875-4696

*** Marmara University, Faculty of Business Administration, Department of Accounting and Finance, eavci@marmara.edu.tr, orcid.org/0000-0003-3172-897X

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NAKİT- NAKİT AKIŞI DUYARLILIĞI: GELİŞMEKTE OLAN ÜLKELER ÖRNEĞİ

ÖZ

Bu çalışma sekiz gelişmekte olan ülkede yer alan finansal açıdan kısıtlı ve kısıtlı olmayan firmaları karşılaştırarak nakit-nakit akışı duyarlılığını analiz etmektedir. 486 üretim firması 2005-2018 yılları arasında Genelleştirilmiş Momentler Metodu tahminleri uygulanarak analiz edilmiştir. Bu firmalar büyüklük, yaş ve Size-Age (SA1), Sales-Age (SA2), ve Kaplan-Zingales (KZ) endekslerine göre kategorilere ayrılmıştır. Analiz sonuçlarına göre hem kısıtlanmış hem de kısıtlanmamış firmaların pozitif nakit-nakit akışı duyarlılığı gösterdiği bulunmuştur. Kısıtlanmamış firmalar dış finansmanı kolaylıkla temin edebilirken, finansal hiyerarşi teorisine dayalı olarak öncelikle kendi iç fonlarını kullanmayı tercih etmektedirler. Sonuçlar ayrıca nakit-nakit akışı duyarlılığının gelişmekte olan ülkelerde finansal kısıtlamaları test etmek için kullanılamayacağını da göstermektedir.

Anahtar Kelimeler: Nakit-nakit akış duyarlılığı, nakit tutma, gelişmekte olan ülkeler, GMM

JEL Sınıflandırması: G30, G32, C33

GENİŞLETİLMİŞ ÖZET

AMAÇ VE MOTİVASYON

Finansal kısıtlar kavramı son 30 yıldır finans literatüründe en çok tartışılan konulardan biri olmasına rağmen hala tam olarak tanımlanamamış bir kavramdır. Bir firmanın finansal açıdan kısıtlı olup olmaması ile ilgili olarak literatürde farklı değişkenler kullanılarak analizler yapılmış olsa da, henüz tam olarak hangi değişkenlerin direk olarak bir firmayı finansal açıdan kısıtlı olarak tanımlayacağı hala tartışma konusudur. Literatürdeki bu tartışmadan yola çıkarak sekiz gelişmekte olan ülkede yer alan imalat firmaları büyüklük, yaş, Size-Age (SA1) Endeksi, Sales-Age (SA2) Endeksi ve Kaplan-Zingales (KZ) Endeksine göre finansal açıdan kısıtlı ve kısıtlı olmayan firmalar şeklinde kategorize edilerek analiz yapılmıştır.

ARAŞTIRMA STRATEJESİ ve YÖNTEMİ

Fazzari vd. (1988)'nin yapmış oldukları çalışma bu alanda yapılan ilk öncü çalışma olarak kabul edilmektedir. Yapmış oldukları çalışmayı asimetrik bilgi teorisine dayandırarak ele almışlardır. Yapmış oldukları çalışmada temettü ödeyen firmaları finansal açıdan kısıtlı olmayan, temettü ödemeyen firmaları da finansal açıdan kısıtlı olarak tanımlamışlardır. Yaptıkları analiz sonucuna göre finansal açıdan kısıtlı olarak tanımlanan firmaların dışsal finansmana erişiminin daha zor olduğunu ve bu firmaların yatırım-nakit akışı duyarlılığının finansal açıdan kısıtlı olmayan firmalara göre daha yüksek olduğunu bulmuşlardır. Bu

çalışmaya karşın Kaplan ve Zingales (1997) yapmış oldukları çalışmada finansal açıdan kısıtlı olmayan firmaların yatırım-nakit akışı duyarlılığının daha fazla olacağı sonucunu bulmasıyla literatürde hala devam eden tartışma başlamıştır. Bu konuyla ilgili literatürde tartışma devam ederken, Almeida ve diğerleri (2004) yılında yapmış oldukları çalışmada nakit-nakit akış duyarlılığını analiz etmişlerdir. Çalışmalarında firmaları temettü ödeme, büyüklük, tahvil ve bono derecelendirmesi ve Kaplan ve Zingales (Lamont ve diğerleri, 2001) endeksine göre finansal açıdan kısıtlı olan ve kısıtlı olmayan firmalar şeklinde kategorize etmişlerdir. Analiz sonuçlarına göre finansal açıdan kısıtlı olan firmaların nakit-nakit akışı duyarlılığı gösterdiği sonucunu bulmuşlardır. Bu çalışmada da sekiz gelişmekte olan ülkede (Arjantin, Brezilya, Şili, Yunanistan, Meksika, Polonya, Güney Afrika, Türkiye) yer alan 486 firmanın 2005-2018 yılları arasında nakit-nakit akışı duyarlılığı 2005-2018 yılları arasında analiz edilmiştir. Literatürle bağlantılı olarak firmalar büyüklük (Almeida ve diğerleri, 2004; Arslan ve diğerleri, 2006; Chang ve diğerleri, 2007; Crisóstomo ve diğerleri, 2014; Devereux & Schiantarelli, 1990; Gertler & Gilchrist, 1993, 1994; Kadapakkam ve diğerleri, 1998); yaş (Arslan ve diğerleri, 2006; Bhaduri, 2005; Chen & Chen, 2012; Cunningham, 2011; Devereux & Schiantarelli, 1990; George ve diğerleri, 2011; Guariglia & Mateut, 2010; Riaz ve diğerleri, 2016); Kaplan ve Zingales Endeksi (Ağca ve Mozumdar, 2008; Almeida ve diğerleri, 2004; Benligiray, 2017; Riaz ve diğerleri, 2016); Size ve Age Endeksi (SA1) (Ağca & Mozumdar, 2008; Hadlock & Pierce, 2010; Machokoto ve diğerleri, 2019; Mulier ve diğerleri, 2016; Riaz ve diğerleri, 2016); Sales ve Age Endeksi (SA2) (Riaz ve diğerleri, 2016) yöntemlerine göre finansal açıdan kısıtlı ve kısıtlı olmayan firmalar şeklinde kategorize edilmiştir. Analiz sonuçlarına göre hem finansal açıdan kısıtlı hem de kısıtlı olmayan firmalarda nakit-nakit akışı duyarlılığı pozitif ve anlamlı bulunmuştur.

BULGULAR ve TARTIŞMA

Çalışmada bulunan analiz sonuçları Almeida ve diğerleri (2014)'nin bulmuş olduğu sonuçlar ile benzerlik göstermemiştir. Almeida ve diğerleri (2004) bulmuş oldukları sonuca göre finansal açıdan kısıtlı olmayan firmalar dışsal finansmana erişim sıkıntısı yaşamadığı için potansiyel karlı projeleri ertelemek zorunda değillerdir ve nakit akışlarına olan duyarlılıkları daha azdır. Bu çalışmada bulunan sonuçlar ise (Azmat & Iqbal, 2017; Baptista e Silva, 2012; Erdogan, 2018; Koo & Maeng, 2018; Lin, 2007; Quader & Abdullah, 2016) ile benzerlik göstermektedir. Ayrıca finansal açıdan kısıtlı olmayan firmalar finansal açıdan kısıtlı olan firmalara göre daha yüksek bir katsayıya sahiptir (Erdogan, 2018; Pál & Ferrando, 2010). Analiz sonuçları şu şekilde yorumlanabilir. İlk olarak, Almeida ve diğerleri (2004) ve diğer ilgili çalışmalar (Acharya ve diğerleri, 2007; Chang ve diğerleri, 2007; Denis & Sibilkov, 2010; Han & Qiu, 2007; López-Gracia & Sogorb-Mira, 2015; Lozano & Yaman, 2020) gelişmiş olan ülkelerdeki firmaları analiz etmişlerdir. Gelişmiş ülkelerde dışsal finansmana ve sermayeye ulaşmak daha kolaydır. Gelişmekte olan

ülkelere göre finansal piyasalar daha çok gelişmiştir ve asimetrik bilginin etkisi daha azdır. Bu çalışmada bulunan sonuçlar, finansal hiyerarşi teorisi (Myers, 1984) ile açıklanabilir. Teoriye göre içsel kaynaklar hem borçlanma hem de hisse senedi ihracına göre daha az maliyetlidir. Bir yatırım fırsatı olduğunda firmalar maliyeti en az olan kendi iç kaynaklarını kullanır, yetersiz olması durumunda ise önce borçlanma ve son olarak da hisse senedi ihracına yönelirler. İhtiyati amaçlı nakit tutma yanı sıra, nakit akışı duyarlılığının derecesi, kısmen nakit akış değişkeni tarafından yakalanan potansiyel yatırım fırsatlarından etkilenir. Bu nedenle finansal açıdan kısıtlı olmayan firmalarda gözükten bu nakit-nakit akış duyarlılığı bu grupta yer alan firmalar için yüksek büyüme fırsatı olduğunu göstermektedir (Pál & Ferrando, 2010).

SONUÇ ve ÖNERİLER

Bu çalışmada sekiz gelişmekte yer alan 486 firmanın nakit-nakit akışı duyarlılığı 2005-2018 yılları arasında analiz edilmiştir. Bulunan sonuçlar, bu konu ile ilgili öncül çalışma olan Almeida ve diğerleri (2004)'in bulmuş olduğu sonuç ile benzerlik göstermemiş, finansal hiyerarşi teorisi (Myers, 1984) ile benzerlik göstermiştir. Sonuçlara göre hem finansal açıdan kısıtlı hem de finansal açıdan kısıtlı olmayan firmalar nakit-nakit akışı duyarlılığı göstermiştir. Ayrıca finansal açıdan kısıtlı olmayan firmalarda katsayı daha yüksek çıkmıştır. Bulgularımıza göre, politika yapıcılar ve yetkililer, gelişmekte olan piyasalardaki firmalar için finansal kısıtlamaların etkisini azaltmak için sermaye piyasalarını geliştirmeli ve alternatif finansman kaynakları yaratmayı düşünmelidir. Bu çalışma yapılırken bazı kısıtlamalar yapılmıştır. Çalışma kapsamında gelişmekte olan ülkelerden sadece sekiz ülkedeki firma verileri göz önüne alınmıştır. Gelecek çalışmalarda araştırmacılar gelişmiş ve gelişmekte olan ülkelerde yer alan firmaların karşılaştırmalı analizini yapabilir. Ayrıca COVID-19 etkisinin görüldüğü 2020 ve 2021 finansal verileri de çalışmaya dahil edilerek bu dönemde finansal açıdan kısıtlı olan ve olmayan firmalar üzerinde COVID-19 etkisi analiz edilebilir.

1. INTRODUCTION

Although the concept of financial constraints has been one of the most debated topics in the field of corporate finance in the last three decades, it continues to be a subject that has not been defined precisely. In the studies conducted in the literature, we can observe the attempt to explain the concept of financial constraints with different financial variables, but these efforts fail to produce an accepted general theory or concept, such as the Modigliani-Miller (MM) theorem, agency cost, pecking order and trade-off theories, etc. Therefore, studies and discussions on this subject continue in the literature. The discussion begins with the article written by Fazzari et al. (1988), hereafter FHP (1988), based on the asymmetric information.

Under the perfect capital markets assumption, the MM theorem suggests that a firm's financial structure is irrelevant to investment decisions, and external and internal financing substitute each other. However, in real-world conditions, capital markets are imperfect, and the validity of this theorem is debated and analyzed in several theoretical and empirical studies through trade-off theory of Kraus & Litzenberger (1973), agency theory of Jensen & Meckling (1976), and pecking order theory of Myers (1984). In imperfect capital markets, internal and external financing do not substitute for each other. If there is a lucrative investment opportunity, and a firm has limited access to external funding, it must rely on the internal funds it has generated for investment. In this scenario, the amount of the firm's investment would be subject to the cash flow provided by the firm, which represents the potential for internal funds. Firms that are financially constrained are much more dependent on internal funds and have difficulties accessing external funds.

The seminal paper by FHP (1988) analyzes the investment - cash flow sensitivity, hereafter ICFS. Their key point is that the sensitivity of investment to cash flow should be higher for firms that face a wedge between the cost of internal and external funds. They support their evidence by showing that low dividend payout firms (financially constrained) have higher ICFS than high dividend payout firms (financially unconstrained). Several subsequent empirical studies, such as Gilchrist and Himmelberg (1995), Hoshi et al. (1991), Schaller (1993), Vogt (1994), and Whited (1992), find that the ICFS is positive and statistically significant for financially constrained firms and is not statistically different from zero for financially unconstrained firms.

Contrary to FHP (1988), Kaplan & Zingales (1997), hereafter KZ (1997), find that firms that are financially unconstrained display a higher level of ICFS. The fundamental critique is that the relationship between investment and cash flow is not a reliable predictor of financial constraints. KZ (1997) evaluate the firms that FHP (1988) identify as financially constrained based on the firms' qualitative and quantitative data, such as letters to stakeholders, financial statements, notes from annual reports, and management discussions about operations and liquidity. In contrast to FHP (1988), KZ (1997) reveal that the ICFS is higher for financially unconstrained firms. Results from subsequent papers corroborate the findings of KZ (1997) (Almeida & Campello, 2001; Chang et al., 2007; Cleary, 1999, 2005, 2006; Dogru & Upneja, 2019; Kadapakkam et al. 1998). Furthermore, Alti (2003), Erickson & Whited (2000) and Gomes (2001) criticize the method used to test? ICFS.

While discussions on ICFS are ongoing, another strand of the debate emerged, and Almeida et al. (2004), hereafter ACW (2004), use cash-cash flow sensitivity, hereafter (CCFS), as a financial constraint criterion. They argue that the link between financial constraints and liquidity demanded by firms depends on whether

financial constraints are an essential determinant of firm behavior. In their study, they reveal that financially constrained firms indicate CCFS, and financially unconstrained firms do not.

In this study, based on the model of ACW (2004), we try to analyze the CCFS with five constraint criteria for 486 manufacturing firms in emerging markets, namely Turkey, Poland, Greece, Brazil, South Africa, Chile, Mexico, and Argentina from 2005 to 2018 using the generalized method of moments (GMM). According to our results, CCFS is significant for both constrained and unconstrained firms, which is contrary to the theory of ACW (2004). Our results are relevant to the pecking order theory. Myers (1984) suggests that internal finance is strongly preferred by firms that believe it has a cost advantage over debt and equity. The major contribution of the study is two-fold. First, since most of the academic articles on CCFS are about firms in developed markets, we consider emerging markets in the study. Second, studies in the literature analyze a single country's data, such as Turkey (Arslan et al. 2006; Erdogan, 2018), Taiwan (Lin, 2007), South Korea (Koo & Maeng, 2018), and Vietnam (Tran, 2020a). In this study, we aim to contribute to the literature by including firm datasets from more countries. The remainder of this paper is organized as follows: Section 2 reviews the financial constraints and cash-cash flow sensitivity, and Section 3 summarizes related literature. Section 4 describes data and research methodology. Section 5 indicates the empirical results, and finally, Section 6 is the conclusion part.

2. FINANCIAL CONSTRAINTS AND CASH - CASH FLOW SENSITIVITY

Two questions are to be answered to examine the effect of cash flow on cash holdings before moving forward. The first question addresses the reasons that motivate firms to hold cash. In the finance literature, four classes of motives are identified for firms to hold cash: (Bates et al., 2009), *transaction*, *precaution*, *agency costs*, and *tax motive*. First, as firms face insufficient internal financing, they can convert non-financial assets into cash, issue new equity and debt, or cut dividends. However, these approaches lead to transaction costs that firms do not want to bear, which is a circumstance that gives way to the transaction motive (Opler et al. 1999). Opler et al. (1999) reveal that firms with the greater access to external funds prefer to reserve less cash as this exposes them to lower transaction costs. Miller & Orr (1966) indicate that intermediation costs could tempt a firm to hold more liquid assets and Kim et al. (1998) show that external financing costs are positively related to corporate liquid assets.

Precautionary motive refers to cash reserves as a hedge against unexpected shortfalls to seize profitable investment opportunities (Bates et al. 2009; Keynes, 1936; Kim et al. 1998). Firms that fail to set funds aside for this motive may be forced to forgo profitable investment projects or struggle against bankruptcy

(Campello et al. 2010). Opler et al. (1999) document that firms with higher growth rates and more risky cash flows tend to hold more cash. Harford et al. (2014) find that firms hold cash to mitigate refinancing risk. *Agency motives* for holding cash results from the conflict of interest between managers and shareholders; managers prefer to use business resources to serve their own interests rather than maximize shareholders' benefits (Jensen & Meckling, 1976). Entrenched managers tend to retain cash instead of making dividend payments to shareholders when faced with negative investment projects. In this way, they increase assets under their control and have power over the firm's investment decisions (Jensen 1986). Managers prefer to use cash that reduces firm risk and increases their decision-making power (Opler et al. 1999). When agency problems are serious between managers and shareholders, cash is worthless (Pinkowitz et al. 2006). Entrenched managers tend to build excess cash but spend quickly (Dittmar et al. 2003; Harford et al. 2008). When firms face higher repatriation taxes, they prefer to hold a large amount of cash abroad, which is an example of a tax motive. Because firms are subject to tax consequences when repatriating foreign earnings; firms and the affiliates for whom these tax consequences of repatriation apply are more likely to hold a considerable amount of cash (Foley et al. 2007).

The second question seeks to identify the optimal cash holding levels for firms. In the literature, there are three main theories related to capital structure and cash holdings: (Ferreira & Vilela, 2004) *trade-off*, *pecking order*, and *free-cash flow theory*. According to the trade-off theory, the optimal level of cash holdings is when the marginal benefit of holding cash is equal to its marginal cost of holding cash (Ferreira & Vilela, 2004; Opler et al. 1999). According to Keynes (1936), firms hold cash for transaction and precautionary motives. When firms consider the marginal benefits and marginal costs of holding cash, the trade-off theory in cash management practices advocates the optimum level of cash holdings. The pecking order theory suggested by Myers (1984) is based on an asymmetric information theory proposed by Myers and Majluf (1984), which documents that the information asymmetries between managers and shareholders make external sources costly. To minimize financing costs, the pecking order theory suggests that firms should finance investments firstly with internal finance, then debt, and finally, with equity as a last resort. The pecking order theory does not have a target cash level, but cash holdings are a buffer between internal finance and investment needs. If a firm's current cash flows are enough to finance the new investments, it can repay its debt and accumulate cash. If not, firms first use their retained earnings and only then issue a debt (Opler et al. 1999). The free cash flow theory (Jensen, 1986) suggests that managers can accumulate cash to increase the assets under their control and gain more power over the investment decisions of the firm. Cash reduces risk for the firm and lets managers invest in projects, which, while often in their own

best interest, may not be in the best interest of the shareholders. To prevent overinvesting, firms should have excess cash when there is a conflict between managers and shareholders.

Keynes (1936) discusses that balance sheet liquidity is affected by access to external financing. If a firm can easily access external funds, the firm is “an unconstrained firm”, and there is no need to keep cash for valuable future investment projects. However, if a firm cannot access external funds, it is “a constrained firm” and must rely on internal funds to invest in worthwhile projects. Liquidity management is vital for this kind of firm.

The theory of ACW (2004) assumes that the company’s propensity to save cash from cash inflows should be related to financial constraints. Since a firm’s investments are constrained by capital market imperfections, it must manage liquidity to maximize value. When firms face financial constraints, they must save cash today for future investment opportunities. Yet, hoarding cash can be costly for firms that forgo projects with a positive net present value (NPV). Therefore, they should establish an optimal cash policy that trades off current investments against profitable future investments (Khurana et al. 2006). The marginal costs of giving up current investments are weighted by the benefits of future investments. On the other hand, unconstrained firms do not have to sacrifice potential current investment projects because holding cash today is without cost; they can find funds through external financing. In a word, the CCFS is significant for constrained firms. In contrast, it should be insignificant for unconstrained firms according to the theory of ACW (2004).

CCFS is better suited as a financial constraint criterion rather than ICFS because it can serve as a buffer against mismeasurements in Q and investment opportunities hidden in cash flow, an occurrence that is the financial nature of the cash stock variable. If cash flow signals a better investment opportunity, firms are not required to raise their cash stock unless they are financially constrained. However, if hedging needs are low, constrained firms use cash to reduce debt (Acharya et al. 2007). Although the ICFS contain valuable information about future investment opportunities, using it to measure the effects of financial constraints may result in an accurate measure of the marginal Q. The advantage of using CCFS is that since cash is a financial variable, firms are unlikely to increase their cash stocks in response to positive innovations in investment opportunities for reasons other than the differentiation between the costs of internal and external funds. Thus, the CCFS is a less ambiguous test than the ICFS (Lin 2007).

3. LITERATURE REVIEW

Almeida et al. (2004) consider all manufacturing firms in the U.S. during the period 1971 - 2000. They use five alternative schemes to classify the firms: payout ratio, size, bond ratings, commercial paper ratings, and the KZ Index. They find that the cash flow sensitivity of cash is positively significant for constrained firms under four of their classifications, the exception being the KZ-Index¹ for constrained firms, and it is indistinctive for unconstrained firms. For each dollar of additional cash flows, constrained firms hold around five to six cents, whereas unconstrained firms do not follow this practice. Khurana et al. (2006) investigate the relationship between financial development and CCFS for 35 countries. The study ascertains that with the increased financial development – the sum of stock market development and the financial intermediary index - firms' CCFS decrease. Faulkender and Wang (2006) analyze the U.S. firms by using four alternative schemes: dividend payout, size, long-term bond rating, and commercial paper rating. Constrained firms indicate higher CCFS than unconstrained firms. An extra dollar of cash holding is more valuable for shareholders in financially constrained firms. Han and Qiu (2007) investigate the publicly traded U.S. firms using quarterly data from 1997 to 2002 by splitting them into these four indices as well, i.e., dividend payout, size, bond ratings and commercial paper ratings. Under all criteria, constrained firms display positive and statistically significant results. Chang et al. (2007) study the impact of CCFS on 420 Australian firms from 1990 to 2003. In the study, constrained firms exhibit higher CCFS than unconstrained firms. Denis and Sibilkov (2010) examine U.S. manufacturing firms categorizing them according to annual dividend payout ratio, firm size, debt rating, and paper rating. Their argument implies that financially constrained firms hoard money for future investment opportunities, so the CCFS should be significant for these firms. Kusunadi and Wei (2011) explore the interaction between the legal protection of investors and the CCFS of firms. Their results reveal that where the legal protection of minority investors is strong, the CCFS of firms decline compared to firms in countries with weak legal protection. López-Gracia and Sogorb-Mira (2015) examine CCFS for Spanish firms, classifying listed firms as unconstrained and unlisted firms as constrained. Unlisted firms display a significant CCFS. Lozano and Yaman (2020) investigate the CCFS for 670 firms from nine European countries, namely Austria, Belgium, Finland, France, Germany, Ireland, Italy, Portugal, and Spain to test whether having family ownership decreases the CCFS or not. They document that non-family-controlled firms indicate a higher CCFS than their family-owned counterparts. Tran (2020a) analyzes the link between corruption and CCFS for 46 countries between 2001 and 2016. He finds that the relation between the corruption index and CCFS is positively and significantly associated. His findings are

¹ Almeida et al., (2004) find statistically significant results for unconstrained firms instead of constrained firms. They criticize that the index does not reflect the correct results.

especially prominent in environments with greater corruption; firms prefer to hold cash for bribery motives and agency motives. Arslan et al. (2006) analyze 220 Turkish firms from 1998 to 2002 by splitting firms based on size, age, dividend payout and business affiliation. They find that CCFS is positive for constrained firms but only statistically significant under the criteria of size and business group, while it is insignificant for dividend payout criteria. Under the age criteria, unconstrained firms indicate positive and statistically significant results. Machokoto and Areneke (2021) examine whether CCFS is asymmetric for 745 firms from eight African countries, namely Egypt, Ghana, Ivory Coast, Kenya, Morocco, Nigeria, South Africa, and Tunisia from 2000 to 2015. They find that constrained firms with positive cash flows save considerably more than unconstrained firms.

On the other hand, in the following studies, the results contradict the findings of ACW (2004). They demonstrate positive CCFS for both constrained and unconstrained firms. Lin (2007) examines the CCFS of 988 Taiwanese firms using an unbalanced panel. The firms are divided by age, bank debt/total debt, whether the firm has ever issued public debt, and the correlation between investment and dividend. The main finding is that both constrained and unconstrained firms demonstrate positive CCFS. Pál and Ferrando (2010) analyze 2190 listed and unlisted firms, and SMEs in the eurozone. They find positive and significant CCFS for all firms, with unconstrained firms having the highest coefficient results. Baptista e Silva (2012) evaluates the CCFS for Portuguese firms from 1996 to 2004. Firms are classified in terms of dividend, size, age, and SA Index. According to the analysis, both financially constrained and unconstrained firms indicate positive and significant CCFS. Quader and Abdullah (2016) investigate 5086 firms in seven European countries. They categorize the firms according to age, size and KZ Index. Their results show that firms display a positive CCFS under all criteria although the effect of CCFS decreases monotonically from constrained firms to unconstrained firms. Azmat and Iqbal (2017) examine the relationship of CCFS for 261 Pakistani firms listed in the KSE from 2003 to 2013. They segment firms according to four criteria: size, dividend payment, KZ Index, and business group affiliation. The results show that both financially constrained and unconstrained firms have positive CCFS. Erdogan (2018) analyzes Turkish firms from 1996 to 2013. She classifies them according to dividend payout, asset tangibility, and sales growth. She reveals that both constrained and unconstrained firms demonstrate CCFS although unconstrained firms tend to hold more cash than constrained ones. Koo and Maeng (2018) examine 898 Korean firms between 1999 and 2014. They cluster firms according to the size, degree of sales volatility, ownership structure, and business organization. They find that Korean firms hold much more cash when they have lower investment opportunities. Tran (2020b) also examines the interaction between monetary loss and CCFS for 751

Vietnamese firms from 2000 to 2017. He finds that the interaction between M2 growth rate and cash flow is negatively related to the cash holding.

4. DATA AND METHODOLOGY

The research examines manufacturing firms in eight emerging markets included in the MSCI Emerging Market Index:² Turkey, Brazil, Mexico, Poland, Argentina, Chile, Greece, and South Africa from 2005 to 2018. The data of the firms are obtained from Thomson Reuters DataStream. When there is missing data on firms, financial reports published by firms on their websites are used. The firm age data used as financial constraint criteria are manually retrieved from Google Search and the websites of the firms. We consider only manufacturing firms, with at least four years of consecutive data to implement panel data methodology and include active and inactive firms to prevent survivorship bias. Firms with non-zero and non-missing data on cash flow, investment, inventories, sales, and total assets are involved in the study. Data from a total of 486 manufacturing firms are used in the study. All variables are winsorized at 1st and 99th percentiles to lower the effect of outliers. All firm-level variables are dollar-denominated.

Panel data analysis has been one of the most used methods in recent years. Among the alternative panel models, dynamic panel models are suitable for our study because fixed and random-effects estimation techniques potentially control for unobservable heterogeneity under the strict exogenous assumption. On the other hand, dynamic panel models include the lagged level of dependent variables as explanatory variables. The strict exogenous variable is violated because the lagged dependent variables are correlated with an idiosyncratic error. In this study, it is suitable to use dynamic variables because the equation includes a lagged variable of the dependent variable as the explanatory variable (Anderson & Hsiao 1981). Under the dynamic models, when series are persistent or if the variance of individual-specific effect is large relative to the variance of the error, the first-differenced GMM estimator of Arellano and Bover (1995) suffers from bias (Dbouk et al. 2020). Hence, the baseline equation model is estimated by the system GMM model created by Arellano and Bover (1995), and Blundell and Bond (1998) with the orthogonal transformation to overcome possible endogeneity and heterogeneity issues and eliminate the autocorrelation problem. Residuals should be correlated with first-order autocorrelation AR(1), and not correlated with second-order autocorrelation AR(2). The Hansen test for over-identifying restrictions is used for the validity of instrumental variables. A system GMM model is applied and includes Windmeijer's (2005) correction for standard errors. We run the *'xtabond2'* Stata package program proposed by Roodman (Roodman 2009a,

² Retrieved from <https://www.msci.com/emerging-markets>

2009b). As suggested by Roodman (2009b), the instruments are collapsed to prevent proliferation problems of variables.

Our baseline regression models for CCFS are based on the literature (Acharya et al. 2007; Almeida et al. 2004; Arslan et al. 2006).

$$\Delta CASH_{i,t} = \beta_0 + \beta_1 \Delta CASH_{i,t-1} + \beta_2 CF_{i,t} + \beta_3 Q_{i,t-1} + \beta_4 SIZE_{i,t-1} + \beta_5 \Delta STD_{i,t} + \beta_6 \Delta NWC_{i,t} + \beta_7 CAPEX_{i,t} + YEAR_i + INDUSTRY_t + COUNTRY_t + \varepsilon_{it} \quad (1)$$

where $\Delta CASH$ is a change in cash holding at time t , the lagged $\Delta CASH$ is a change in cash holding at time $t-1$. CF is a cash flow, Q is Tobin's Q , $SIZE$ is a natural logarithm of total assets, ΔSTD is a change in short-term debt, ΔNWC is a change in non-cash net working capital, and $CAPEX$ is a capital expenditure. All variables are scaled by total assets to prevent spurious regressions. When firms increase their cash balance in the previous year, they prefer to hold less in the following year. The theory concerns the change in cash holding in response to a shock in cash flows captured in β_2 . Cash flow is expected to be positive and significant for constrained firms and unknown for unconstrained firms. Q provides information about the future growth opportunities for the firms. Q is expected to be positive for constrained firms but insignificant for unconstrained firms (Almeida et al. 2004; Denis & Sibilkov, 2010; Fazzari et al. 1988; Kusnadi & Wei 2011). $SIZE$ is included to capture the economics of the scale of cash management. The sign of the size is unclear in the literature. The coefficient of size indicates wide variations across estimations (Almeida et al. 2004; Erdogan, 2018; Han & Qiu, 2007; Lin, 2007). The sign of the change in short-term debt is uncertain. Firms may prefer to use their cash to pay their debts, or they may regard short-term debt as cash and cash equivalents and benefit from external financing for liquidity management (Koo & Maeng, 2018; Pál & Ferrando, 2010). It is expected for the relationship between the change in cash holding and the change in non-cash working capital to be negative for both types of firms because working capital can be a substitute for cash. Most of the studies support the negative relationship between capital expenditure and cash (Almeida et al. 2004; Dittmar & Mahrt-Smith, 2007; Guizani, 2017; Uyar & Kuzey, 2014). On the other hand, Opler et al. (1999) claim that capital expenditure increases with the increase of liquid assets, and Bates et al. (2009) assert that creating assets from capital expenditure can be used for collateral, as capital expenditure enhances the debt capacity of the firm. This reduces the demand for cash. Finally, we add the year, industry, and country dummies to control the variations based on these. Table 1 gives a definition of each variable.

Table 1. Definition of Variables

Explanatory Variables	Definitions	Symbol
CASH	Change in cash and cash equivalents from t-1 to t	Δ CASH
CASH FLOW	Income before tax, interest, and depreciation/amortization	CF
SIZE	Natural logarithm of total assets	SIZE
Q	Market value of total assets to book value of total assets	Q
NET WORKING CAPITAL	A change in noncash working capital (current assets - current liabilities - cash and cash equivalents) from t-1 to t	Δ NWC
SHORT-TERM DEBT	A change in short term debt from t-1 to t	Δ STD
CAPEX	Capital expenditures	CAPEX

Since the seminal work by FHP (1988), several financial constraints criteria have been used to test methodologies empirically. There are several acceptable approaches for categorizing firms as financially constrained or unconstrained: such as size, dividend, age, commercial paper ratings, bond ratings, ownership structure, Kaplan-Zingales (KZ) Index, Whited-Wu (WW) Index, and Size-Age (SA) Index. In this study, five classification criteria are employed. Beck et al. (2006) use the survey data from a study of over 10,000 firms in 80 countries to determine how effective a priori classifications are in distinguishing between financially constrained and unconstrained firms. Their results affirm that size, age, and ownership are useful as a priority classification of financing constraints. Because of the lack of data, the ownership structure is not included. Therefore, size and age are used as single-variables proxies in this study. The effect of cash flow on investment is more notable for young and small firms (Devereux & Schiantarelli, 1990). It is beneficial to use indices for the financial constraint criterion, as it includes multiple variables, and qualitative and quantitative information about the firms. Consequently, three indices are used: Kaplan and Zingales (KZ) Index, Size - Age (SA1) Index and Sales - Age (SA2) Index respectively.

Size

In the literature, total assets, total sales, or the number of employees (Gezici et al. 2019; Özmen et al. 2012; Riaz et al. 2016; Yeşiltaş, 2009) are used as a financial proxy for size. Following the previous studies (Almeida et al. 2004; Arslan et al. 2006; Chang et al. 2007; Crisóstomo et al. 2014; Devereux & Schiantarelli, 1990; Gertler & Gilchrist, 1993, 1994; Kadapakkam et al. 1998), total assets are used as a financial proxy for size, and we rank firms in each country based on their total assets and classify them as financially constrained or unconstrained if their size is below or above the median size value. Small firms

have more external finance premiums than big firms, which might be attributed to two factors. First, big firms have more collateral assets that allow them to effortlessly finance their investment. Second, big firms often have a business group that facilitates the use of their own internal funds. Additionally, small firms are financially constrained because they are more dependent, cannot issue public debt, and have a potential idiosyncratic risk. Small firms are generally younger, have a greater degree of firm-specific risk, and have less collateral, thereby decreasing the chance of receiving external finance (Gertler & Gilchrist, 1993, 1994). As financial institutions have more information about big firms, asymmetric information is reduced (Bernanke et al. 1996).

Age

Younger firms are not widely known, and there is less information about these firms. However, there is ample awareness of older firms, as they have a reputation in the market (Guariglia & Mateut 2010). There are different types of usage in the literature regarding age criteria. Firms are categorized as young or old based on the year the firms are listed in the stock exchange (Chen & Chen 2012; Devereux & Schiantarelli 1990; Machokoto et al. 2019). On the other hand, other studies use the foundation year of the firms (Arslan et al. 2006; Bhaduri 2005; George et al. 2011; Riaz et al. 2016). In this study, firms are classified in each country based on their foundation year and defined as financially constrained or unconstrained, depending on whether their age is below or above the median age value (Cunningham, 2011; Guariglia & Mateut, 2010; Schiantarelli & Sembenelli, 2000).

Kaplan and Zingales (KZ Index)

Lamont et al. (2001) construct a multidimensional general index of financial constraints using the results of KZ (1997).

$$KZ\ Index = -1.002 \times Cashflow + 0.283 \times Q + 3.139 \times Total\ Debt/Total\ Capital - 39.368 \times Dividends - 1.315 \times Cash\ and\ Cash\ Equivalents \quad (2)$$

Cash flow, dividends and cash holdings are scaled by plant, property, and equipment. If a firm is above (below) the median value in the KZ index, it is accepted as a constrained (unconstrained) firm in the sample. Ağca and Mozumdar (2008), Almeida et al. (2004), Benligiray (2017) and Riaz et al. (2016) use KZ Index in their research.

Size -Age (SAI) Index

Hadlock and Pierce (2010) construct a new index based on size and age criteria. They believe that the two criteria are less endogenous than other sorting variables. Size is the natural logarithm of the total assets.

Age is defined as the number of years the firm is in public. In contrast to the KZ Index, if a firm is above (below) the median value, it is accepted as an unconstrained (constrained) firm in the sample.

$$SA1 \text{ Index: } (-0.737 \times \text{Size}) + (0.043 \times \text{Size}^2) - (0.040 \times \text{Age}) \quad (3)$$

SA Index is used by the previous studies by (Ağca & Mozumdar 2008; Machokoto et al. 2019; Mulier et al. 2016; Riaz et al. 2016).

Sales - Age (SA2) Index

Riaz et al. (2016) use the natural logarithm of sales instead of the total assets as a size proxy. They get consistent results in their analysis when sales are used as a proxy. We also use the Sales-Age Index as a proxy.

$$SA2 \text{ Index: } (-0.737 \times \text{Sales}) + (0.043 \times \text{Sales}^2) - (0.040 \times \text{Age}) \quad (4)$$

5. EMPIRICAL FINDINGS AND DISCUSSIONS

Table 2 shows the descriptive statistics for CCFS. The average cash to total asset ratio is approximately 10%. Studies in the literature also finds the average ratio between 5% - 10% for emerging markets, such as 10% for Taiwanese firms (Lin 2007); Brazilian firms (Manoel & Moraes 2018); Turkish firms (Arslan et al. 2006; Uyar & Kuzey 2014); 5% for Chilean firms (Álvarez et al. 2012).

Table 2. Descriptive Statistics								
Country	# Firms	CASH	CF	Q	SIZE	STD	NWC	CAPEX
Argentina	18	0.08	0.06	1.26	12.11	0.12	0.08	0.05
Brazil	62	0.15	0.07	1.01	13.80	0.12	0.04	0.05
Chile	35	0.08	0.08	0.88	13.06	0.08	0.12	0.05
Greece	40	0.07	0.01	0.34	11.04	0.24	0.01	0.03
Mexico	33	0.10	0.08	1.21	14	0.07	0.08	0.05
Poland	102	0.08	0.06	1.05	11.27	0.10	0.08	0.05
South Africa	27	0.08	0.11	0.96	12.08	0.07	0.13	0.06
Turkey	167	0.09	0.07	0.95	11.84	0.13	0.07	0.05
mean		0.09	0.07	0.96	12.54	0.12	0.08	0.05
median		0.08	0.07	0.99	12.45	0.11	0.08	0.05
Notes: CASH is a cash and cash equivalents. CF is a cash flow, Q is the market value to the book value of assets, SIZE is a natural logarithm of total assets, STD is a change in short-term debt, NWC is a non-cash net working capital, CAPEX is a capital expenditure. All variables are scaled by total assets.								

The correlation matrix and VIF are given in Table 3. The mean VIF is 1.87, so there is no multicollinearity problem among variables. Δ CASH has positive correlations with CF, Q, and SIZE, whereas it has negative correlations with Δ STD and Δ NWC and CAPEX. CF has positive correlations with all variables except Δ STD.

Table 3. Pairwise Correlation Matrix								
Variables	Δ CASH	CF	Q	SIZE	Δ STD	Δ NWC	CAPEX	VIF
Δ CASH	1.000							
CF	0.092***	1.000						1.61
Q	0.023	0.056***	1.000					1.01
SIZE	0.057***	0.133***	-0.018	1.000				1.04
STD	-0.055***	-0.473***	-0.002	0.032*	1.000			2.67
NWC	-0.105***	0.578***	0.006	0.012	-0.781***	1.000		3.05
CAPEX	-0.043***	0.150***	0.014	0.094***	0.044**	-0.017	1.000	1.06

Notes: Δ CASH is a change in cash holding. CF is cash flow, Q is the market value to the book value of assets, Δ STD is a change in short-term debt, Δ NWC is a change in non-cash net working capital, CAPEX is a capital expenditure. All variables are scaled by total assets. SIZE is the natural logarithm of total assets. VIF is the variance inflation factor. The mean VIF is 1.87. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 4 displays the empirical results of CCFS according to the SIZE and AGE criteria. Table 5 indicates the results based on the SIZE-AGE Index (SA1) and SALES-AGE Index (SA2) criteria, and Table 6 demonstrates the results concerning the Kaplan and Zingales Index (KZ). According to the analysis, the relationship between cash flow and cash holding is positive under all criteria. This shows a positive and significant CCFS. These analysis results are different from the results of ACW (2004) because unconstrained firms do not have to forfeit potential current investment projects, as holding cash today is without cost to them, and they can find funds through external financing. In brief, the CCFS should be insignificant for unconstrained firms. Our results are similar to (Azmat & Iqbal, 2017; Baptista e Silva, 2012; Erdogan, 2018; Koo & Maeng, 2018; Lin, 2007; Quader & Abdullah, 2016). Moreover, unconstrained firms have a higher coefficient than constrained firms as founded by (Erdogan, 2018; Pál & Ferrando, 2010).

Analysis results can be interpreted as follows. First, studies by ACW (2004) and subsequent papers (Acharya et al. 2007; Chang et al. 2007; Denis & Sibilkov, 2010; Han & Qiu, 2007; López-Gracia & Sogorb-Mira, 2015; Lozano & Yaman, 2020) focus on U.S. and other developed markets. Our results may not be consistent with ACW (2004) since it is less costly for developed markets to access external financing and capital. Financial markets are more developed and asymmetric information is less pronounced than that of developing markets (Khurana et al. 2006). Our results are linked to the pecking order theory by (Myers 1984); internal finance is strongly preferred by firms, and they believe that it has a cost advantage over debt and equity. If internal finance is not available for the project's funding, firms issue debt and, finally, as a

last resort, they issue equity. We argue that apart from the precautionary savings, the degree of cash flow sensitivity is influenced by potential investment opportunities captured partly by the cash flow variable. Therefore, the highest sensitivity seen in unconstrained firms simply reflects the high growth opportunities for this group of firms (Pál & Ferrando, 2010).

For all criteria, when the lagged change in cash holding increases, the change in cash holding decreases in the current year. This supports the idea that firms adjust their target level after a change in cash holdings (Cho-Min, 2017; Erdogan, 2018; Opler et al.1999). Size has a negative relationship with the change in cash holdings for financially constrained firms. When a firm's size grows, it prefers to hold less cash, validating the economies of scale in cash management. (Azmat & Iqbal 2017; Erdogan 2018; Han & Qiu 2007; Koo & Maeng, 2018). Change in short-term debt has a negative and significant relationship with cash holdings. Firms prefer to use their cash to pay their debts instead of regarding short-term debt as cash and cash equivalents, and benefit from the external financing for liquidity management (Koo & Maeng, 2018; Pál & Ferrando, 2010). Change in non-cash net working capital has a negative and significant relationship with change in cash holding, suggesting that the working capital is a substitute for cash holding.

Finally, capital expenditure has a negative and significant relationship with cash holdings in line with (Almeida et al. 2004; Chen, 2008; Dittmar and Mahrt-Smith, 2007; Guizani, 2017; Uyar & Kuzey, 2014). Firms prefer to hold cash when forgoing their physical investments. They do not use their assets for collateral.

Table 4. Analysis Results According to the SIZE and AGE Criteria

Variables	SIZE				AGE			
	FC		NFC		FC		NFC	
	1	2	3	4	5	6	7	8
<i>ΔCASH</i>	-0.07425*	-0.07287*	-0.16483***	-0.16191***	-0.14465***	-0.14289***	-0.11966***	-0.11700***
	(0.042)	(0.042)	(0.032)	(0.032)	(0.037)	(0.036)	(0.038)	(0.038)
<i>CF</i>	0.09415**	0.09331**	0.20605***	0.20799***	0.11520**	0.11258*	0.18456***	0.18394***
	(0.040)	(0.039)	(0.054)	(0.053)	(0.058)	(0.059)	(0.049)	(0.049)
<i>L_Q</i>	0.00023**	0.00022**	0.00299	0.00272	0.00005	0.00005	-0.00205	-0.00227
	(0.000)	(0.000)	(0.002)	(0.002)	(0.000)	(0.000)	(0.005)	(0.005)
<i>SIZE</i>	-0.03044**	-0.02947**	0.00089	0.00220	-0.00615	-0.00495	-0.00160	-0.00106
	(0.013)	(0.013)	(0.007)	(0.007)	(0.005)	(0.005)	(0.002)	(0.002)
<i>ΔSTD</i>	-0.06144**	-0.06127**	-0.09399**	-0.09225**	-0.08084***	-0.08372***	-0.06163**	-0.06418**
	(0.024)	(0.024)	(0.040)	(0.040)	(0.029)	(0.029)	(0.029)	(0.029)
<i>ΔNWC</i>	-0.11980***	-0.11933***	-0.20070***	-0.20492***	-0.16502***	-0.16664***	-0.12738***	-0.13055***
	(0.035)	(0.034)	(0.038)	(0.038)	(0.043)	(0.044)	(0.034)	(0.034)
<i>CAPEX</i>	-0.25164***	-0.25487***	-0.16167**	-0.16213**	-0.22787***	-0.24209***	-0.15201***	-0.15435***
	(0.064)	(0.065)	(0.066)	(0.066)	(0.081)	(0.084)	(0.055)	(0.056)
<i>YEAR</i>	YES	YES	YES	YES	YES	YES	YES	YES
<i>COUNTRY</i>	YES	YES	YES	YES	YES	YES	YES	YES
<i>INDUSTRY</i>	YES	YES	YES	YES	YES	YES	YES	YES
<i>Observations</i>	2449	2449	2597	2597	2504	2504	2568	2568
<i>Wald</i>	60.08***	62.91***	216.67***	213.01***	126.77***	131.72***	119.18***	162.21***
<i>ar1</i>	-4.66***	-4.67***	-5.76***	-5.75***	-4.67***	-4.69***	-5.85***	-5.88***
<i>ar2</i>	0.11	0.10	-1.12	-1.09	-0.83	-0.89	0.16	0.12
<i>Hansen</i>	70.55	72.41	42.07	41.88	91.51	89.05	69.64	68.7

Notes: *FC* is financial constrained, and *NFC* is financially unconstrained. *ΔCASH* is change in cash holding at time *t*, the lagged *ΔCASH* is change in cash holding at time *t-1*, *CF* is a cash flow, *Q* is the market value to the book value of assets, *SIZE* is a natural logarithm of total assets, *ΔSTD* is change in short-term debt, *ΔNWC* is change in non-cash net working capital, *CAPEX* is a capital expenditure. All variables are scaled by total assets. Under the *SIZE* criteria, firms are ranked in each country based on their assets and categorized as financially constrained (unconstrained) if their size is below (above) the median size value. Under the *AGE* criteria, firms are ranked in each country based on age and categorized as financially constrained (unconstrained) if their age is below (above) the median age value. *AGE* is defined as the foundation year of the firm. Standard errors in parenthesis *** p<0.01, ** p<0.05, * p<0.1.

Table 5. Analysis Results According to the SA1 Index and SA2 Index Criteria

Variables	Size – Age (SA1) INDEX				Sales – Age (SA2) INDEX			
	FC		NFC		FC		NFC	
	1	2	3	4	5	6	7	8
$\Delta CASH$	-0.08814** (0.036)	-0.08669** (0.036)	-0.17563*** (0.039)	-0.17410*** (0.038)	-0.08700** (0.040)	-0.08525** (0.040)	-0.17777*** (0.037)	-0.17678*** (0.037)
CF	0.06135** (0.029)	0.06027** (0.029)	0.24739*** (0.038)	0.24888*** (0.038)	0.08974** (0.042)	0.08925** (0.043)	0.18588*** (0.066)	0.18627*** (0.065)
Q	-0.00042 (0.002)	-0.00051 (0.001)	-0.00012 (0.000)	-0.00011 (0.000)	0.00026 (0.000)	0.00025 (0.000)	-0.00045 (0.003)	-0.00058 (0.003)
$SIZE$	-0.01840** (0.009)	-0.01646* (0.009)	-0.00365 (0.005)	-0.00276 (0.005)	-0.02094** (0.008)	-0.01972** (0.009)	-0.00246 (0.003)	-0.00190 (0.003)
ΔSTD	-0.05167*** (0.019)	-0.05211*** (0.019)	-0.09255*** (0.034)	-0.09215*** (0.033)	-0.03524 (0.021)	-0.03686* (0.022)	-0.09269** (0.037)	-0.09503*** (0.037)
ΔNWC	-0.08939*** (0.026)	-0.08931*** (0.026)	-0.20639*** (0.042)	-0.20776*** (0.041)	-0.09191*** (0.032)	-0.09328*** (0.032)	-0.19802*** (0.045)	-0.20184*** (0.046)
$CAPEX$	-0.20968*** (0.053)	-0.21089*** (0.053)	-0.08194 (0.073)	-0.08114 (0.073)	-0.20281*** (0.060)	-0.20543*** (0.061)	-0.08742 (0.079)	-0.08885 (0.078)
$YEAR$	YES	YES	YES	YES	YES	YES	YES	YES
$COUNTRY$	YES	YES	YES	YES	YES	YES	YES	YES
$INDUSTRY$	YES	YES	YES	YES	YES	YES	YES	YES
$Observations$	2479	2479	2553	2553	2457	2457	2572	2572
$Wald$	63.81***	65.02***	160.68***	190.15***	62.06***	62.44***	122.98***	132.80***
$ar1$	-4.68***	-4.69***	-5.53***	-5.57***	-4.46***	-4.48***	-5.76***	-5.80***
$ar2$	-0.12	-0.23	-1.61	-1.63	0.12	0.11	-1.63	-1.65
$Hansen$	47.96	47.26	76.50	76.48	56.58	55.84	99.21	99.14

Notes: FC is financially constrained, and NFC is financially unconstrained. $\Delta CASH$ is change in cash holding at time t , the lagged $\Delta CASH$ is change in cash holding at time $t-1$, CF is a cash flow, Q is the market value to the book value of assets, $SIZE$ is a natural logarithm of total assets, ΔSTD is a change in short-term debt, ΔNWC is change in non-cash net working capital, $CAPEX$ is a capital expenditure. All variables are scaled by total assets. $SA1$ Index: $(-0.737 \times SIZE) + (0.043 \times SIZE^2) - (0.040 \times AGE)$. $SIZE$ is the natural logarithm of total assets. AGE is defined as the number of years the firm is in public. $SA2$ Index: $(-0.737 \times SALES) + (0.043 \times SALES^2) - (0.040 \times AGE)$. $SALES$ is the natural logarithm of total sales. Standard errors in parenthesis. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6: Analysis Results According to the KZ Index Criteria

Kaplan and Zingales (KZ) INDEX				
	FC		NFC	
<i>Variables</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>
<i>ΔCASH</i>	-0.1713*** (0.040)	-0.1685*** (0.039)	-0.1386*** (0.034)	-0.1353*** (0.034)
<i>CF</i>	0.1372*** (0.040)	0.1380*** (0.040)	0.1649*** (0.077)	0.1648*** (0.079)
<i>Q</i>	0.00120 (0.002)	0.00115 (0.002)	0.00008 (0.005)	0.00008 (0.005)
<i>SIZE</i>	-0.00213 (0.003)	-0.00124 (0.002)	-0.00024 (0.005)	0.00065 (0.005)
<i>ΔSTD</i>	-0.03333 (0.024)	-0.03592 (0.024)	-0.07609* (0.043)	-0.07733* (0.044)
<i>ΔNWC</i>	-0.1009*** (0.026)	-0.10302*** (0.026)	-0.18796*** (0.056)	-0.18930*** (0.056)
<i>CAPEX</i>	-0.09860** (0.047)	-0.10253** (0.046)	-0.32785*** (0.078)	-0.32978*** (0.080)
<i>YEAR</i>	YES	YES	YES	YES
<i>COUNTRY</i>	YES	YES	YES	YES
<i>INDUSTRY</i>	YES	YES	YES	YES
<i>Observations</i>	2484	2484	2449	2449
<i>Wald</i>	98.62***	108.75***	112.89***	112.49***
<i>ar1</i>	-3.79***	-3.80***	-5.28***	-5.32***
<i>ar2</i>	-0.09	-0.15	-0.68	-0.66
<i>Hansen</i>	68.49	68.82	85.80	86.66

Notes: *FC* is financially constrained, and *NFC* is financially unconstrained. *ΔCASH* is change in cash holding at time *t*, the lagged *ΔCASH* is change in cash holding at time *t-1*, *CF* is a cash flow, *Q* is the market value to the book value of assets, *SIZE* is a natural logarithm of total assets, *ΔSTD* is change in short-term debt, *ΔNWC* is change in non-cash net working capital, *CAPEX* is a capital expenditure. All variables are scaled by total assets. Under the *KZ Index* criteria, if the index scores are below (above) the median value, firms are categorized as financially unconstrained (constrained) firms. $KZ\ Index = -1.002 \times Cashflow + 0.283 \times Q + 3.139 \times Total\ Debt/Total\ Capital - 39.368 \times Dividends - 1.315 \times Cash\ and\ Cash\ Equivalents$. Standard errors in parenthesis *** p<0.01, ** p<0.05, * p<0.1.

6. CONCLUSION

The discussions on financial constraints begin with the findings provided by FHP (1988), which show that financially constrained firms indicate a positive ICFS. Later, KZ (1997) finds that financially unconstrained firms show positively significant ICFS, contrary to the findings of FHP (1988). The debate is still ongoing, and an exact definition of financial constraints has yet to be made. While ACW (2004) debate whether ICFS is valid for financial constraints, they use cash-cash flow sensitivity as a financial constraint criterion. They find that CCFS is significantly positive for financially constrained firms and insignificant for unconstrained firms. In this paper, we try to analyze the model of ACW (2004) for emerging markets. It is thought that it would be better to analyze emerging markets because of the more asymmetric information, less developed financial markets, and limited financing resources in emerging markets compared to developed ones. We examine 486 manufacturing firms between 2005

and 2018.) We reveal that CCFS is positive and significant for both financially constrained and unconstrained firms, which is contrary to the results of ACW (2004). We also find that the coefficient of unconstrained firms is higher than that of constrained firms. Our results are relevant to the pecking order theory by Myers (1984), suggesting, first, that internal finance is strongly preferred by firms and that it has a cost advantage over debt and equity. If internal finance is not sufficient for the funding of the project, firms issue debt and, ultimately, issue equity as a last resort. Financially constrained firms have higher coefficients because the highest observed sensitivity of unconstrained firms clearly reflects the high growth opportunities of this group. Constrained firms, on the other hand, hold cash to hedge against cash flow fluctuations. Secondly, CCFS should be considered in the light of the flow of external financing. According to our findings, policymakers and authorities should consider improving the capital markets and create alternative financing sources to decrease the degree of financial constraints for firms in emerging markets.

In this study, we have firms from eight emerging markets. In further studies, the dataset can be expanded. The effects of COVID-19 on the cash-cash flow sensitivity or a comparison of the global financial crisis and COVID-19 can be analyzed to test if constrained and unconstrained firms display similar corporate behavior in the environment these two important events create. The impact of macroeconomic variables on CCFS can be examined to analyze the impact of macroeconomics variables.

YAZARLARIN BEYANI

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This paper complies with research and publication ethics, has no conflict of interest to declare, and has no received financial support.

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