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NASA FUNDING IN CONGRESS: MONEY MATTERS

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ABSTRACT

This paper argues that individual members of Congress engage in economic opportunism, voting in the best interests of their constituents based on economic heuristics, when considering space policy legislation. Multivariable logit analysis is conducted on five votes in the House of Representatives to test the hypotheses. The economic opportunism effect is captured in the models by the presence of NASA Centers, relative importance of space industry and NASA procurements. Findings suggest that economic benefits to a member's constituency can play an important role in legislative voting, particularly when legislation deals with federal aerospace funding, when space policy bills lack over-reaching bi-partisan support. In recent years the National Aeronautics and Space Administration (NASA) has seen its funding fall prey to partisan budget battles and party line voting, but this was not historically the norm. As we move forward into a future where NASA funding may become more scrutinized and politicized, this paper supports the thesis that individual members of Congress care more about the funds for their constituents than the other aspects of space policy.

KEY WORDS

space policy, economic opportunism, legislative behavior, NASA, budgeting

JEL CODES

H11, H57, K39, Z18

1 INTRODUCTION

In the months before the U.S. Government shutdown of 2013, the U.S. Senate and the U.S. House of Representatives faced a showdown over the reauthorization of the National Aeronautics and Space Administration (NASA)'s budget for 2014–2016. For the most part, NASA reauthorizations have been non-partisan endeavors, and even when they are somewhat

partisan, the lines are not drawn as close as was seen in the confrontation between H.R.2687 and S.1317, the House and Senate versions of the National Aeronautics and Space Administration Authorization Act of 2013. H.R.2687 authorized about $1.5 billion less per year from 2014 through 2016 than S.1317, a roughly 8% budget cut by comparison. Each bill was only narrowly approved by its respective committee along party lines (Committee on Science, Space and Technology, 2013; King, 2013; SpaceRef, 2013 and Leone, 2013). Subsequently, neither bill was voted on or even called to the floor in its respective chamber. This confrontation marked the first time NASA authorization legislation fell prey to strict partisan voting, but not the first time that NASA authorization was subject to politicization.

This seemingly rare event leads us to wonder what is in store regarding the future of NASA funding, and to question what motivated legislators to support or oppose space related legislation in the past. The case for supporting NASA funding is often made out of national interest, but legislators may actually be more opportunistic in their voting behavior. Congress members could be supporting space legislation based upon the relative importance of space activities within their state, in essence voting to improve the economic situations within their states through federal dollars directed to NASA (Machay and Steinberg, 2015). This follows in line with the theory that members of Congress are likely to work in the interests of particular industries when legislation directly impacts an industry with an important role within their district (Kingdon, 1989).

This paper demonstrates that members of Congress are opportunistic in regards to their support towards space legislation; supporting or opposing space legislation that benefits their constituency rather than the nation as a whole. Specifically, we argue that the impact of the space industry within their state is a major factor towards the likelihood that a member of Congress supports legislation that relates to NASA funding due to potential direct benefits the funding will have for their constituents. This paper also tries to end the period of underutilization of U.S. Congress votes data (Pomeroy, 2019).

This study starts by discussing the history of space legislation in Congress and identifies roll call votes of interest that allow for the testing of potential motivations for voting decisions in regards to space policy and its funding. Then, considering established theories of legislative behavior pertaining to voting, we develop two specific testable hypotheses regarding the motivations of member of Congress choosing to support or oppose space legislation. Multivariable logit analysis is conducted to test the hypotheses and results are presented. The study concludes with implications of the findings regarding the future of legislative behavior towards space policy, and avenues for continued research.

2 LEGISLATIVE BEHAVIOR TOWARDS SPACE POLICY

Legislative behavior is a complication of a member of Congress wishing to enact good public policy while looking to satisfy constituents and balance the influences of their party, other legislators, and the administration (Kingdon, 1977). Their voting is thus based on self-interest theory where the legislator is likely to vote for bills in the economic or ideological interest of their constituency, or engage in other actions, such as logrolling or pandering to special interests, all in line to benefit their potential re-election (see for example Mayhew, 1974; Fiorina, 1974; Stigler, 1971; Kau and Rubin, 1979; Peltzman, 1984 and Kingdon, 1989).

Members of Congress consider policy along a dimension, voting for or against a policy based on the proximity to where they stand on the issue both personally and in regards to

their constituent's interests, while also relying on cues from other members and their party more generally (MacRae, 1958; Clausen, 1973; Stimson, 1975; Snyder and Groseclose, 2000; Ansolabehere et al., 2001 and Kingdon, 1989). In regards to budgetary legislation, changes are made slowly with only small increases or decreases based on previous decisions and actions (Wildavsky, 1964 and Davis et al., 1966).

In regards to constituent desires towards space policy, there does not appear to be a clear relationship whereby members would vote for legislation leading to increased federal space spending based on public opinion (Steinberg, 2011). Moreover, as the majority of the population lacks solid awareness of NASA's budget in the first place, public opinion on the issue is likely to play only a small roll in congressional decision making (Launius, 2003 and Steinberg, 2013). Additionally, compared to the number of bills considered by Congress, space legislation is relatively rare. This implies that few members of Congress are likely to be highly knowledgeable in this issue area and must instead rely on party cues or economic heuristics.

The structure of the institutions within Congress suggests space policy is important as both houses maintain specific subcommittees to address space policy related issues. In the Senate there is a Subcommittee on Space, Science, and Competitiveness having responsibility for space science and policy, currently chaired by Texas Senator Ted Cruz. The Subcommittee on Space of the House of Representatives is currently chaired by republican Texas Representative Brian Babin. Perhaps not surprisingly, the membership of both subcommittees consists of a disproportionate number of legislators from states with strong aerospace ties. Despite this strong institutional structure, many pieces of space related legislation fail to make it to the floor for a vote because the bills involve dramatic changes in space policy.[1] The lives of these drafts are short and usually their only action is they are referred to the given subcommittee.

Historically, ideology manifested through the political party system has appeared to play a role in space policy, but the degree to which this happens is far from clear. Previous research is full of antidotes suggesting that legislators of different parties had clearly distinctive preferences towards space policy. During the 1970s for example, there were partisan debates regarding manned versus unmanned programs and both programs vis-a-vis domestic social programs. Examples of such conflicts still show members breaking party ranks when economic interests come into play (Hoff, 1997). Additionally, party line voting may be more an artifact of supporting the president rather than related to a partisan issue agenda. For example, a dozen Republican legislators who voted to support the International Space Station while George H. W. Bush was president switched their votes when the legislation re-appeared under the Clinton administration; similarly thirteen Democrats in the house also switched from "nay" to "yea" (Launius and McCurdy, 1997). These examples suggest party cues may not be as important as economic ones.

Over the last twenty-five years, bills regarding NASA appropriation have, for the most part, avoided major controversy by calling for only minor changes in space policy. In the last quarter century there have been 25 bills which were voted on by Congress as a whole and then presented to the President. They are listed in Tab. 1. In the Senate none of these bills have recorded votes, and only eight of these bills have recorded votes in the House of Representatives – plus one that failed in the Senate. This makes 10 recorded votes in total. Of these votes, five votes passed the bill with near unanimous support. This leaves us with five votes by which we can test for the potential of opportunistic voting by members of Congress, which will be addressed in detail below.

[1] Supportive bills included for example H.R.3057 Space Exploration Act of 2003, H.R.3898 Zero Gravity, Zero Tax Act of 2000 or H.R.1631 National Space Port Act of 1995. Restrictive bills included H.R.407 To terminate the International Space Station Alpha program of 1995 or H.R.2656 To cancel the participation of the United States in the Space Station program of 1995.

Tab. 1: Space Legislation in Congress – Presented to President

Bill Nr.	Introduced	Title (abbreviated if necessary)	House	Senate
S.1180	6/14/1989	A bill to authorize the President to appoint Richard Harrison Truly to the Office of Administrator of NASA	Passed	Passed
S.2124	2/8/1990	National Space Council Authorization Act of 1990	Passed	Passed
S.2287	3/9/1990	NASA Authorization Act, Fiscal Year 1991	Passed	Passed
H.J.Res.214	4/11/1991	To recognize the Astronauts Memorial at the J. F. K. Space Center as the national memorial to astronauts who die in the line of duty	Passed	Passed
H.R.1988	4/23/1991	NASA Authorization Act, Fiscal Year 1992	Passed 361-36	Passed
H.R.2130	4/30/1991	National Oceanic and Atmospheric Administration Authorization Act of 1992	Passed	Passed
S.Con.Res.123	5/21/1992	A resolution authorizing the use of the East Front parking lot of the Capitol for an exhibit by NASA during the period 6/1/1992 to 6/5/1992	Passed	Passed
H.R.6133	10/5/1992	Land Remote Sensing Policy Act of 1992	Passed	Passed
H.R.6135	10/5/1992	NASA Authorization Act, Fiscal Year 1993	Passed	Passed
S.J.Res.187	5/11/1994	A joint resolution designating July 16 through July 24, 1994, as "National Apollo Anniversary Observance"	Passed	Passed
H.R.1702	5/22/1997	Commercial Space Act of 1998	Passed	Passed
H.R.1654	5/3/1999	NASA Authorization Act of 2000	Passed 259-168	Passed*
H.R.1654	9/14/2000	NASA Authorization Act of 2000 (*with Conference report)	Passed 399-17	Passed
H.R.2607	7/26/1999	Commercial Space Transportation Competitiveness Act of 2000	Passed	Passed
S.610	3/13/2003	NASA Flexibility Act of 2004	Passed	Passed
H.R.5382	11/18/2004	Commercial Space Launch Amendments Act of 2004	Passed 269-120	Passed
S.1281	6/21/2005	NASA Authorization Act of 2005	Passed	Passed
H.Con.Res.448	7/13/2006	Commending the NASA on the completion of the Space Shuttle's second Return-to-Flight mission	Passed	Passed
H.R.6063	5/15/2008	NASA Authorization Act of 2008	Passed 409-15	Passed
H.R.3237	7/16/2009	To enact certain laws relating to national and commercial space programs as title 51, U.S. Code, "National and Commercial Space Programs"	Passed	Passed
H.Con.Res.292	6/30/2010	Supporting the goals and ideals of National Aerospace Week, and for other purposes	Passed 413-0	Passed
S.3729	8/5/2010	NASA Authorization Act of 2010	Passed 304-118	Passed
H.R.4158	3/7/2012	To confirm full ownership rights for certain U.S. astronauts to artifacts from the astronauts' space missions	Passed	Passed
H.R.6586	11/9/2012	Space Exploration Sustainability Act	Passed	Passed
H.R.667	2/13/2013	To redesignate the Dryden Flight Research Center as the N. A. Armstrong Flight Research Center and the Western Aeronautical Test Range as the H. L. Dryden Aeronautical Test Range	Passed 394-0	Passed
H.R.4412*	4/7/2014	NASA Authorization Act of 2014	Passed 401-2	Failed
H.R.810*	2/9/2015	NASA Authorization Act of 2015	Passed	
H.R.2262	5/12/2015	U.S. Commercial Space Launch Competitiveness Act	Passed 284-133	Passed
H.R.6007	9/13/2016	To amend title 49, U.S. Code, to include consideration of certain impacts on commercial space launch and reentry activities in a navigable airspace analysis, and for other purposes	Passed 425-0	Passed
S.3346*	9/15/2016	NASA Transition Authorization Act of 2016		Passed
H.R.321	1/5/2017	Inspiring the Next Space Pioneers, Innovators, Researchers, and Explorers (INSPIRE) Women Act	Passed	Passed
S.442	2/17/2017	NASA Transition Authorization Act of 2017	Passed	Passed

Notes: Passed without roll results expresses that the bill was passed by Unanimous Consent or by Voice Vote.
*The bill was not presented to President.
We include the drafts to illustrate the changed reality surrounding the NASA Authorization Acts.
Source: U.S. Congress (2018).

3 HYPOTHESES

If we consider a general model of legislative behavior where members of Congress consider constituents desires and personal beliefs in regards to voting for what they see as good policy, we have the following theories about voting on space policy related legislation.

Given the aforementioned problems with understanding public opinion on space issues, we instead assume that legislators serve as trustees of the people on these matters, voting in ways that support the best interest of their constituents rather than based upon their direct desires. Therefore, we believe that members of Congress, lacking a strong public opinion cue for which way to vote, may ignore party cues and instead use economic cues by which they will support legislation that will benefit their constituency's general economic well-being. This leads us to our first testable hypothesis:

H1: *Members of Congress will base their support for space legislation upon the degree of importance that the space industry plays in their state.*

However, there is another economic cue easily at hand for the members of Congress – NASA procurements allocated to the given state. While extracting information about the absolute and relative importance of the space industry can be time-consuming the information about the NASA procurements is provided by NASA with annual frequency. Hence, the second testable hypothesis is:

H2: *Members of Congress will base their support for space legislation upon NASA procurements allocated to the given state.*

4 DATA & METHODS

4.1 Legislation of Interest

Using econometric models with space explanatory variables can reveal whether members of the House take into account the importance of space activities and procurements when voting during the floor action. In order to conduct a data driven statistical analysis, rather than continue to rely on antidotal evidence, the most suitable bills and roll-call votes for analysis are those without the unanimous support, as only those pieces of legislation will allow for the revelation of the causes in variation of support. Therefore, we are specifically interested in the following pieces of legislation: the NASA Authorization Act of 1992, the 2000 NASA Authorization Act, the 2004 Commercial Space Launch Amendments Act, the 2010 NASA Authorization Act, and the 2015 Commercial Space Launch Competitiveness Act. Even though the aerospace industry data are not available for the NASA Authorization Act of 1992, we still use this vote when testing the hypothesis regarding NASA procurements.

H.R.1988, National Aeronautics and Space Administration Authorization Act, Fiscal Year 1992, was introduced on April 23, 1991. The bill was passed on the floor of the House about a week later with a vote of 361 to 36. The controversy of this bill is not as clear cut as others in our sample, nor is the vote as contentious. However, the contention is likely economic in nature and thus worthy of consideration. The legislation suggests a large cut back to the funding of Space Station Freedom (a program since evolved into the International Space Station), and Democrats who controlled congress at the time were particularly sensitive to spending issues given the economic recession. Additionally, there was lingering political and economic contention in regards to the Space Exploration Initiative proposed by President George H. W. Bush only two years earlier (Lambright, 2009).

H.R.1654, the National Aeronautics and Space Administration Authorization Act of 2000, from May 3, 1999. It passed on the floor of the House with a vote of 259 to 168 little bit over two weeks after it was introduced. The controversy of this bill was caused by the House Committee that wanted to terminate the currently known Deep Space Climate Observatory project. Apart from this quite a radical change the Committee introduced variety of small adjustments across the bill. Further amendments passed on the floor influenced the economic impacts of the bill with a changed distribution of the NASA's budget. This bill became an object of politicization which was mitigated in the Senate. After the Senate made some adjustments the bill passed in the House.

H.R.5382, the Commercial Space Launch Amendments Act of 2004, addressed the ambiguity in regulations regarding private spaceflight and was designed to promote the development of the commercial space flight industry. The bill builds on the previous one (H.R.3752) which was highly bipartisan but its legislative journey finished in the Senate after a unanimous passage in the House (402 to 1). The bill was introduced again as H.R.5382 and crafted to be a more balanced as a compromise for the Senate (Capitolwords, 2004). The major controversy of this bill was based on the safety of the passengers and crews of commercial vehicles. Citing the Republican S. L. Boehlert who answered to this controversy that "This bill tries to strike a delicate balance between the need to give a new industry a chance to develop brand-new technology and the desire to provide enough regulation to protect the industry's customers" (Capitolwords, 2004). As a result of previous bills with the same focus this bill wasn't changed significantly during the legislative process. However, the safety and regulation concerns made from a bipartisan bill an issue that divided parties within the House. Interestingly, this bill only marginally affected NASA and its funding, and thus its lack of bipartisan support is unlikely to be explained due to economic impact. This seemingly low controversy bill was introduced on November 18, 2004 and passed the House two days later 269 to 120.

S.3729, the National Aeronautics and Space Administration Authorization Act of 2010 was introduced after a recently failed H.R.5781, NASA AA of 2010 H.R.5781. S.3729 bill put a larger stress on the development of the new crew transportation system and eliminated the controversy related to the Section 304 regarding the temperature measurements of NASA. The bill still divided the House due to the choice between NASA's manned space program and its partial privatization. The bill eventually passed with a vote of 304 to 118.

H.R.2262, the U.S. Commercial Space Launch Competitiveness Act of 2015 was mostly a necessary reaction to a development of commercial launch capabilities. As such it was not particularly controversial because it mostly updates liabilities, definitions and some other minor legal aspects. However, there was a rather large controversy raised due to its Title III, a section titled "Space Resource Exploration and Utilization Act of 2015." This shorter part of the Act transfers asteroids and their resources from no-ownership to private-ownership without the global consent, a contradiction to international law. For more on the matter see Nelson (2015) or Tronchetti (2015). Despite this contradiction, the bill passed 284 to 133.

4.2 Key Variables of Interest

In line with the hypotheses the key variables of interest include a set of proxies for the importance of the space industry and the NASA procurements. The importance of the space industry is modeled using two distinct variables. The first is the presence of the NASA center within the member's state. The second is a percentage of employees belonging to the NAICS codes Nr. 336414 to 336419 (space industry as defined in Machay, 2012) on total employment in NAICS code Nr. 336 Transportation equipment manufacturing.

Given the lack of clear public opinion cues on space policy, members of Congress must instead use economic cues in order to serve their constituents' best interests. The importance of

the space industry serves as an economic proxy and is measured through the existence of a NASA center within the member's state, within the member's district, within the member's neighboring district, and the degree of space industry employment in the state.

NASA centers play a financial and a "prestige" role (Machay and Steinberg, 2015) that might be important for the members of Congress. The support for the space policy legislation does not need to be directly related to financial aspects only. The prestige effect might make some members of Congress being more likely supportive even though there is no direct financial benefit.[2]

The percentage of employees engaged in the space industry will be used as a proxy for a relative importance of space activities within the given state. The variable was created using the NAICS codes data of the U.S. Census Bureau (2016) in a conservative approach described in Machay and Steinberg (2015). This variable measures a direct financial benefit of space related activities manifested in the state's labor market. Members of Congress from states with relatively larger space related labor market should be more likely to support the given bill.

To test the second hypothesis we used the NASA procurements from the contractors based on the geographical distribution which is provided in NASA Annual Procurement Reports (NASA, 2015). The data are real values of NASA spending per capita. Therefore, procurement figures are the NASA allocated dollars being spent in that particular state for goods and services of private contractors recalculated to per capita level.

4.3 Control Variables

Previous research in political science has suggested that individual legislator's personal interest towards an issue may play a role in congressional voting (Kau and Rubin, 1993). While much of the political science literature dismisses the role of legislative 'shirking' we still feel it is prudent to control for it (Poole and Romer, 1993; Bender and Lott, 1996). While it would be difficult to know an individual legislator's predisposition towards supporting space policy, previous findings suggest that younger, Republican, well-educated, high-socioeconomic status males are most likely to be the "issue public for space" (Whitman Cobb, 2011). Previous findings of a respondent's political affiliation being associated with space policy may be questionable as men, higher income individuals, and older people are all also more likely to be Republican. In a study controlling for these other factors, party is not seen to be affecting support for space funding increases (Steinberg, 2013). Gender based associations with support for increasing NASA's budget have, however, been re-confirmed.[3] Additionally, gender has been shown to influence voting on gender based issues more broadly (Swers, 1998). Therefore gender may serve as the best, if not only uncorrelated proxy for individual legislator's personal interest in space policy.[4]

Technical education is an important control both in regards to their knowledge of the topic as well as their underlying interest in space policy. In this study, the variable is defined as postgraduate education in the fields of physics, engineering or aviation technologies, including

[2]Some may believe that NASA Centers would be better suited only as a district rather than a state metric. There is good reason to examine it as a state based metric. The first is that the NASA Center may be in one district but those who work for the center may be in a neighboring district. These district lines may also be influenced by redistricting. For example, the Johnson Space Center was part of TX-9 from 1965 to 2005, then part of TX-22 until 2012, and now part of the newly formed TX-36. Therefore, it could be expected that members of congress for any or all of these districts may be influenced by the existence of Johnson Space Center. Moreover, the financial benefits of the center would likely be to the state as a whole. For example, the existence of a NASA center may lead to more jobs in the state, attract skilled workers, bring more industry to the state, and therefore subsequently boost the state's overall economy. Additionally, members with a larger interest may appeal to the state delegation as a whole given the overall potential statewide impacts. See Kingdon (1989) for more on that aspect.

[3]The strong association between gender and support for increased space funding was also found in Steinberg (2013).

[4]A member's own personal feelings towards an issue can influence their voting behavior. However, it is often difficult to know if these policy preferences reflect their personal beliefs or if they have previously been influenced or conditioned based upon other factors, such as constituent or party pressures (Kingdon, 1989).

a pilot's license. Additionally, the desire to pursue a technical degree may also demonstrate a personal interest in space policy (Nadeau, 2013). However, given that few members of Congress would fit this category, it is not expected that such a characteristic will play an important role.

The general make up of Congress, being well-educated and of higher economic status than the country as a whole may be part of the reason, at least historically, that so many space policy bills were unanimously or nearly unanimously supported. Given that most members of Congress fit these characteristics, the analysis only controls for technical education, gender, and age.[5]

To control for the possibility that members of Congress would wrongly correlate aircraft manufacturing and the space industry as both benefiting from space related funding, the percentage of aircraft manufacturing (NAICS codes Nr. 336411–3) on the Transportation equipment manufacturing was included in the analysis. Some members of the House might perceive the space industry as tightly related to the aircraft manufacturing industry. Hence, they could support NASA not for its own sake but as a support of this closely related industry. However, they might be oblivious to the details of the space industry. Even though the research shows that these two industries are closely interrelated (see for example Ferguson, 2013). Aircraft manufacturing is therefore also included as in the analysis to examine this potential effect.

It should be noted that the relative importance of the space industry based on NAICS codes does not correlate with the location of NASA centers. This lack of correlation is one of the key reasons to include both variables in the analysis. Each variable, hence, reveals a different dimension of space activities in relation to general public. Even though the space and air activities are seen frequently as similar (Ferguson, 2013), the production sides of these activities are not highly related. The correlation of relative importance of these two industries is practically zero (for example for 2010 data it is 0.02). Two different members of the House from different districts can decide on two different motivations. In one case the motivation can be driven by the support for the jobs in the space industry and the second one by the aircraft manufacturing. Technically educated experts might see the variations in the production processes of these two industries but most of the members of the House do not have technical education. Hence, their support might be based on an apparent similarity of these two. For this reason, it makes sense to control for such misinterpretation of the similarity.

To filter our any relation between general economic state of things at the moment of the vote we included the real GDP per capita from previous year (hence, the data that were available at the moment of the vote) and the rate of unemployment for the given state from a month preceding the vote.

4.4 Model

Using logistical regression of the variables of interest and the control variables on the dependent variable of vote choice allows for an examination of our hypotheses. The same general model is employed for each of the roll-call votes of interest:

$$
\begin{aligned}
\text{Vote Choice} \;=\; & \beta\,(\text{age}) \\
& + \beta\,(\text{gender}) \\
& + \beta\,(\text{technical education}) \\
& + \beta\,(\text{party ID}) \\
& + \beta\,(\text{log of GDP per capita}) \\
& + \beta\,(\text{unemployment rate}) \\
& + \beta\,(\text{NASA centers at the state,} \\
& \qquad \text{district and neighborhood level}) \\
& + \beta\,(\text{space industry}) \\
& + \beta\,(\text{aircraft industry}) \\
\text{or} \; & + \beta\,(\text{NASA procurements per capita})
\end{aligned}
$$

Variables are coded as follows based on the member of Congress at the time of each vote: Vote Choice is coded as one when supporting

[5] Even though the average and median age are higher among members of Congress than in general population age still varies significantly (illustrated by the standard deviation shown in Tab. 2).

Tab. 2: Descriptive Statistics of Control Variables

	NASA AA of 1992	NASA AA of 2000	Commercial Launch 2004	NASA AA of 2010	Commercial Launch 2015
Voted (N)	399	427	389	422	417
Required	200 (Majority vote)	214 (Majority vote)	260 (2/3 vote)	282 (2/3 vote)	209 (Majority vote)
Democrats	266	211	207	254	188
Males	406	375	344	352	346
Tech Education	53	19	18	26	37
Age Mean	52.39	53.56	55.92	58.30	57.77
Age Min	30	29	31	29	31
Age Max	81	77	81	87	86
Age Standard Deviation	10.05	9.37	9.42	10.18	10.63
NASA Procurements per capita Mean	37.50	33.47	31.32	37.34	34.29
NASA Procurements per capita Min	0.00	0.00	0.00	0.01	0.00
NASA Procurements per capita Max	270.92	180.75	168.86	245.38	317.23
Real GDP per capita Mean	26,235	44,241	45,575	47,515	49,032
Real GDP per capita Min	17,309	17,508	30,003	31,885	31,522
Real GDP per capita Max	68,487	69,570	67,998	71,114	71,056
Unemployment rate Mean	6.49	4.27	5.38	9.42	5.40
Unemployment rate Min	2.40	2.60	3.20	3.70	2.70
Unemployment rate Max	9.90	6.60	7.30	13.60	7.00
Share of space employment Mean		4.74	4.36	4.82	5.74
Share of space employment Min		0.00	0.00	0.00	0.00
Share of space employment Max		37.97	47.64	52.50	53.19

Sources: Civic Impulse (2014a, 2014b, 2014c, 2016), U.S. House of representatives (2016), U.S. Congress (2016, 2018), NASA (2015), BLS (2017), BEA (2017).

a bill and zero when opposing a bill; age is age of the member of the House; gender is coded as one for males and zero otherwise; technical education is coded as one for technical post-graduate education or other forms as mentioned previously and zero otherwise; political party ID is coded one for Democrats and zero for Republicans; real GDP per capita is used in a logarithmic form; unemployment level is used as a percentage; NASA centers is coded one if the member has a NASA center or significant site located within the state they represent, or within the district they have been elected for, or if his or hers district is in close vicinity of such a center; spacecraft represents a percentage of employment in spacecraft manufacturing on transportation equipment manufacturing in the given state and aircraft is a percentage of employment in aircraft manufacturing on transportation equipment manufacturing. Betas represent corresponding estimated effects of the variable.

The second model testing the second hypothesis is designed in a similar manner only the variables space industry and aircraft industry are replaced by NASA procurements to private entities. NASA procurements are expressed as dollars per capita for the given state in the year preceding the year of vote.

Correctness of predictions is compared to the correctness of predictions of a "naïve model" where only the constant was used. The performance of the models was measured by the Youden's J statistic calculated as

$$J = \frac{\mathrm{TP}}{\mathrm{TP}+\mathrm{FN}} + \frac{\mathrm{TN}}{\mathrm{TN}+\mathrm{FP}} - 1,$$

where TP are true positive values, FN false negatives, TN true negatives, and FP false positives. The closer the Youden's J statistic to one the better the model is.

5 RESULTS & ANALYSIS

The results of each of the four logit models testing the first hypothesis are presented in Tab. 3. Generally speaking, model design is useful in explaining the behavior of the members of the House except the NASA AA of 2010. This vote was influenced by other aspects since the Youden's J statistic is practically zero. Model as a whole improves the naïve model only slightly. Partly due to the two strong effects estimated within the model. While there is a strong "NASA state level proudness effect" it is counteracted by even stronger "envy effect" of members from NASA center neighboring districts. The effect related with the spacecraft manufacturing is at its mean negligible (0.8%). Other votes' results provide support confirming that the NASA proudness effect is strong no matter what is being a subject of the vote. Even though the common sense suggests it should be getting stronger the closer to the center given member is but the proudness effect is the strongest at the state level. The hypothesis, as Authorization Acts which contribute financial benefits appear to be only a bit influenced by the importance of the space industry. Hence, the null hypothesis about no effect cannot be rejected universally. The importance of aerospace industry plays some role but it appears the role is changing in effect and in being in play. It seems members of the House rely on this metric on a vote based basis. Additionally, the results suggest that a members political party is also a strongly predictor in voting for space legislation more generally.

Depending on the bill, at hand, the results suggest that members of Congress act as good trustees for their constituency by supporting bills they believe will provide economic benefits to their constituency. The role of NASA centers in this regard is the clearest. When a piece of legislation is contentious, the results for the 2000 and 2010 Authorization Acts show that in matters of direct funding, members of Congress with a NASA center in their state will indeed support the legislation. The role of the aerospace industry more generally appears to be less clear. This may imply that members of Congress are less aware of the role of industry and instead focus on easier to understand heuristics such as the existence of NASA centers. Alternatively, the legislative connection with NASA centers may be due to non-economic factors that we are unable to take into account in the analysis.

When examining the 2010 Authorization Act, both having a NASA center and having a higher degree of space industry within a member's state were associated with increased likelihood of support. However, the strong "envy effect" of members from neighboring districts counteracted heavily. The fact that there was a divided vote on this piece of legislation perhaps suggests that the national priority of NASA is slipping, or that members who were not likely to see economic benefits for their constituents would rather spend the money elsewhere. Regardless, it implies clear opportunism by legislators.

When examining the effects of industry for the 2000 Authorization Act, the NASA center effect is still present, but so too is a strong positive effect of aircraft manufacturing. This could be an example of wrongly associating the industries or it could actually be more strategic. The Authorization Act of 2000 secured the funds for the development of the second generation reusable launch vehicle. With no doubt, the technological spin-offs of this program would highly benefit the aircraft manufacturing industry.

Given the results in 2000, it is somewhat surprising that the aircraft industry effect was not present in 2010. The decision between the Constellation program and privately provided access to space might have been confusing for legislators with aircraft industry interests as the legislation both increases opportunity for private industry participation while negatively affecting existing contractors. Members of Congress likely lacked knowledge on how to best represent the interest of the aircraft manufacturing industry due to the unclear implications of this radical change. This trend changed five years later when another Commercial Space Launch Act was considered in

Tab. 3: Aerospace Industry and Legislative Voting

	NASA AA of 2000			Commercial Launch 2004			NASA AA of 2010			Commercial Launch 2015		
	Coefficient	**Std. error**	**Marginal effect**	**Coefficient**	**Std. error**	**Marginal effect**	**Coefficient**	**Std. error**	**Marginal effect**	**Coefficient**	**Std. error**	**Marginal effect**
Constant	9.836	8.725		41.860***	14.184		6.725	8.687		1.931	14.427	
Age	−0.001	0.017	−0.000	−0.010	0.018	−0.001	0.003	0.011	0.000	−0.047***	0.016	**−0.004**
Gender	0.822*	0.464	**0.180**	0.690	0.446	0.070	0.144	0.317	0.028	1.016**	0.437	**0.109**
Technical education	0.899	0.898	0.141	0.725	1.073	0.046	0.348	0.507	0.061	−1.456*	0.847	**−0.192**
Political party	−4.223***	0.376	**−0.717**	−5.320***	0.742	**−0.620**	0.448*	0.241	**0.087**	−6.174***	0.753	**−0.767**
log GDP per capita	−0.796	0.818	−0.156	−3.308**	1.288	**−0.274**	−0.531	0.791	−0.101	0.647	1.340	0.053
Unemployment rate	0.087	0.176	0.017	−0.410*	0.228	**−0.034**	−0.132*	0.074	**−0.025**	−0.566**	0.243	**−0.047**
Center in state	1.175***	0.377	**0.207**	0.788*	0.437	**0.060**	1.117***	0.320	**0.193**	0.714*	0.411	**0.054**
Center in district	0.842	1.145	0.132	0.187	1.066	0.014	−0.370	1.146	−0.076	−1.613	1.903	−0.239
Center in neighboring district	0.000	0.855	0.000	−1.089	0.934	−0.136	−1.395*	0.780	**−0.324**	−0.736	0.914	−0.080
Space employment rate	−0.080***	0.018	**−0.016**	0.024	0.024	0.002	0.042**	0.018	**0.008**	0.014	0.017	0.001
Aircraft emp. rate	0.026***	0.008	**0.005**	0.007	0.013	0.001	0.007	0.005	0.001	0.028***	0.010	**0.002**
N		425			388			422			417	
Correct predictions		87.1%			83.8%			73.0%			89.7%	
Correct predictions Naïve model		60.7%			69.2%			72.0%			68.1%	
Youden's J statistic		0.747			0.667			0.055			0.801	

Notes: *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Tab. 4: NASA Procurement and Legislative Voting

	NASA AA of 1992			NASA AA of 2000			Commercial Launch 2004			NASA AA of 2010			Commercial Launch 2015		
	Coefficient	**Std. error**	**Marginal effect**	**Coefficient**	**Std. error**	**Marginal effect**	**Coefficient**	**Std. error**	**Marginal effect**	**Coefficient**	**Std. error**	**Marginal effect**	**Coefficient**	**Std. error**	**Marginal effect**
Constant	13.623	10.692		3.753	8.212		39.761***	14.065		0.142	8.162		−14.947	13.505	
Age	−0.008	0.017	−0.001	−0.001	0.016	−0.000	−0.010	0.018	−0.001	0.002	0.011	0.000	−0.047***	0.016	**−0.004**
Gender	0.273	0.667	0.021	0.696	0.438	0.155	0.629	0.451	0.063	0.008	0.317	0.001	0.987**	0.426	**0.109**
Technical education	−0.077	0.520	−0.005	0.868	0.854	0.144	0.816	1.075	0.051	0.311	0.519	0.052	−1.412*	0.820	**−0.190**
Political party	−1.028**	0.437	−0.066	−3.864***	0.333	**−0.686**	−5.276***	0.739	**−0.617**	0.497**	0.243	**0.091**	−5.934***	0.736	**−0.750**
log GDP per capita	−0.981	1.025	−0.068	−0.151	0.770	−0.031	−3.110**	1.278	**−0.260**	0.028	0.742	0.005	2.145*	1.265	**0.183**
Unemployment rate	−0.123	0.158	−0.008	−0.078	0.169	−0.016	−0.383*	0.226	**−0.032**	−0.047	0.076	−0.009	−0.307	0.218	−0.026
Center in state	0.058	0.681	0.004	0.042	0.417	0.009	1.032**	0.486	**0.078**	0.461	0.403	0.079	0.811*	0.434	**0.064**
Center in district	P (vote | center in district) = 1			0.295	1.148	0.056	0.073	1.070	0.006	−0.530	1.171	−0.107	−1.455	1.739	−0.212
Center in neighboring district	P (vote | center neig. dis.) = 1			−0.802	0.816	−0.184	−1.247	0.913	−0.165	−1.712**	0.831	**−0.393**	−0.722	0.891	−0.081
NASA procurement per capita	0.012[X]	0.008	0.001	0.013***	0.004	**0.003**	0.000	0.004	0.000	0.017***	0.005	**0.003**	0.002	0.003	0.000
N		398			425			388			422			417	
Correct predictions		90.5%			86.6%			83.2%			72.5%			88.7%	
Correct predictions Naïve model		90.5%			60.7%			69.2%			72.0%			68.1%	
Youden's J statistic		0.000			0.739			0.665			0.027			0.795	

Notes: [X]The statistical significance was very near to $\alpha = 0.1$ ($p = 0.116$), *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

the House as aircraft industry was strongly associated with voting yes on the 2015 vote, while more NASA related economic indicators are not.

Looking at the results more generally, space economic factors were not associated with supporting the 2004 and 2015 legislation that lacked any direct economic impacts. Voting on these bills was subject to party affiliation effects, suggesting that when funding is not at stake a bill can still be susceptible to partisan influences. This outcome may in fact be the most important, suggesting that there is an ideological aspect to be considered in space policy that is often not taken into account.

This suggests that general pieces of legislation are not object of economic opportunism while when the piece of legislation affects or has a potential to affect jobs within the districts the legislators tend to rely on economic metric in their decision making. Resulting effect is then related with expected outcome of the bill.

We started the analysis with testing the first hypothesis that focused on real economic data variables – jobs and NASA presence. However, the second part of the analysis aims at the direct monetary benefits which are an indirect consequence of funds allocated to NASA.[6] The results testing the second hypothesis are presented in Tab. 4.

Testing the second hypothesis provides one additional vote that can be analyzed – the NASA Authorization Act of 1992. Looking at the Youden's J statistic the quality of the models is slightly worse than in the previous case. An interesting result is obtained for the NASA Authorization Act of 1992. With only 38 members voting against the bill the mean based logit model will predict only yeas. A mean member of the House has a too high probability of voting yea. In this case there is not much of a variability in the data to be explained. Which is shown by probability one in the case of members who are from the districts or neighboring districts with NASA presence.

Not only is the second hypothesis supported but NASA procurements appear to have a stronger explanatory power than the variables related to the relative importance of the aerospace industry. The data show that higher levels of NASA procurement dollars are associated with support for all three authorization acts. For the 2000 and 2010 Authorization Acts the association is significant at the $p < 0.01$ level, while for the 1992 Authorization act the association is significant at the $p < 0.117$ level. Additionally, in these models NASA centers do not appear to have any explanatory power.

There are two possible explanations. First, while NASA centers and spacecraft manufacturing are not highly correlated, they do reflect in some way the geographical distribution of NASA procurements. On one hand the NASA centers can be a source of procurements in their neighborhoods and on the other the procurements provided in other states took place in the same state where the procurement was awarded – headquarters and production sites of private businesses are located in the same region. Second, it can be easier for the members of Congress to use economic cue in the form of NASA procurements – it is easily at hand instead of extracting the real data on employment from the public labor databases.

Interesting is the alternation of NASA state level proudness effect and NASA procurement. If members vote on money related bill the procurement takes over and the proudness effect dissipates. If a general draft of law is being voted on the procurements are of no consequence for the legislators and they follow the proudness effect. It seems from the results that when money is being in question money matters very much.

Across both hypotheses when legislation deals with NASA's budget, economic cues are at work in decision-making through various forms. However, when a general space policy bill is considered economic cues do not seem to play as much of a role. Even NASA is a subject of economic opportunism of legislators.

[6]Notice that the procurements can be earned by the company in the given state but the economic activity (jobs mostly) can take place in another state within the U.S.

6 CONCLUSION

The main focus of this paper was to understand the degree of economic opportunism taking place in regards to space policy. This work shows that researchers should consider the potential for economic opportunism within technology policy legislation, especially where the public lacks interest and knowledge such as with space policy. The results presented above clearly demonstrate that these economic effects are indeed present in some cases of space policy legislation. The realities of space policy and space spending do affect legislative decision making.

All three bills concerned with federal spending were accompanied by space related economic opportunism – in one form or another. Meanwhile, bills related to more general policy change that did not have direct budget implications were not as likely to be subject to economic opportunism. While NASA centers may be the simplest heuristic, NASA procurement may be a better one in the case money being the object of interest. NASA centers may serve as more than just an economic heuristic for legislators, and members from given states may be supporting legislation for reasons other than direct economic impact.

However, when considering bill with the most direct monetary effects the explanatory power of the presence of NASA centers vanishes. The results suggest that the individual members of Congress are more likely to consider the direct monetary payoff related with the NASA Authorization Acts via NASA procurements. From this point of view there is strong evidence that the space policy and the funds related with NASA are more about the money than anything else. One could even argue that legislative support for NASA spending is just about the procurements. The more money NASA is spending in a state the more likely representatives from those states will support NASA authorization acts, at least when the bill is controversial due to a policy aspect.

Despite these findings, we must be mindful of generalization based on these five bills as most space related legislation passes in Congress with unanimous support. While the NASA Authorization Acts are accompanied by various degrees of economic opportunism, the evidence for an economic argument is mixed in regards to the space industry when taken alone. The significant negative effect of the spacecraft industry in the 2000 vote is cause for concern regarding economic opportunism, though there are multiple possible explanations.

First, because only a simple majority was needed to pass the bill, this opened the door for more sophisticated voting. Given the strong Republican support towards the bill and the existence of a Republican majority in the house, it was already likely that the bill was going to pass (more on sophisticated voting in Krehbiel and Rivers, 1990; Banks, 1985 or Volden, 1998). Therefore, a legislator could actually vote against the bill with the argument that it does too little for the space industry and space policy. Hence, it is insufficiently beneficial for the voters and the district. The legislator demonstrates to the voters that he is strongly supportive of the cause and capable to articulate his more ambitious ideas. At the same time his opposition does not prevent the bill to pass. In reality nothing would be changed except his voters are now aware of his space activism.

Second, the bill actually harms the interests of the space industry within particular states and thus legislators voted against it in hopes of a revised and more beneficial bill. Legislators from the states where NASA centers are located still voted to support the bill as the negative impact on the industry may not also be a negative impact on the NASA centers themselves. Legislators with NASA Centers in their states may also be under political pressure to support all NASA legislation regardless of the specifics as the public may not understand the nuanced voting and only see their legislator being anti-NASA.

Third, the opposition towards the bill could be a factor of politicization of space policy whereby economic concerns failed to outweigh other political concerns. Given the political situation surrounding this particular case, this is

most likely the cause. Despite that many space policy bills are introduced as bipartisan, they can easily become ones ripe for partisan politics though the addition of provisions that divide the parties. Just in the examples discussed here, these provisions included environmental issues, safety issues – more precisely the extent of governmental regulation, and radical changes in already existing and running programs. Future qualitative research is necessary involving examination of the specific content of space policy legislation to better understand some of the nuanced behavior of legislators.

Despite the potential for economic opportunism, it is rare that the passing of the NASA Authorization Acts is not eventually secured. Most of the work in this arena is done in space responsible committees and subcommittees of Congress. A good example from the recent years is the NASA Authorization Act of 2013. Several attempts were made in Congress to alter NASA's course by the bills H.R.2616 (introduced 7/8/2013), S.1317 (introduced 7/17/2013) and H.R.2687 (introduced 7/15/2013). None of these pieces of legislation made it from the given sub/committee to the floor. A less-controversial bill, H.R.4412 NASA Authorization Act of 2014 was introduced in April 7th. This bill was a compromise drawing from the above-mentioned bills and with bipartisan support passed the subcommittee (U.S. House of Representatives, 2014). Even though the bill was reshaped to be less controversial, it still failed in the Senate.

Given the strong positive effect of NASA Centers and even stronger effects of NASA procurements, it would seem that it would be in NASA's interests to spread more of their activities across the United States and to highlight the direct monetary benefits for the local economies. This may lead to increase support for NASA across the country rather than support being limited to space related constituencies. This strategy can be especially fruitful in democratic leaning states so that space policy could be more strongly linked to jobs. Meanwhile, NASA can also highlight and stress the link between the space industry and aircraft manufacturing in order to promote support from states with those industries that may not be aware of the impact NASA has on their constituents.

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THE "THREE-D-RELATIONSHIP": DO DEMOCRACY AND DEVELOPMENT LEAD TO INCREASED DEBT?

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ABSTRACT

The paper aims to test the research hypothesis of whether more democratic and economically developed countries tend to have higher public debts (the "Three-D-Relationship") or not. The hypothesis was tested on a panel of 91 countries over the period from 2012 to 2016 using a two way analysis of variance where debt was the dependent variable and regime type and income levels were factors. The results only partially confirmed the hypothesis. Higher democratic standards did correlate with higher debt levels. Similarly, higher income levels also correlated with bigger debt burden. Both "democracy" and "development" combined was not linked to higher debt levels.

KEY WORDS

democracy, authoritarian regimes, economic development, public debt, GDP, public policy

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H11, H60, H63, P51

1 INTRODUCTION

Democracy, development and debt are among the key variables of economic and political economy research. The high public debt levels can be observed in several developed countries. The debt-focused research accelerated recently due to concerns about debt after the 2008 financial crisis which was followed by the sovereign debt crisis in several of the developed countries. Interestingly, some of the high-debt countries are well established democracies, such as the US, France, Italy, Japan and others. Democracy, and its impact on economic variables, gains its academic attention due to the challenges that traditional democratic countries of the developed world are exposed when compared to the new strong economic players of emerging economies which are often not full democracies (China, Russia and others). Demographic changes and automation are changing social patterns of the rich democratic

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states and beyond. How to preserve democracy and standard of living in the situation of an aging population and more automation? Is the shift of the fiscal burden to the next generation through majority voting in democracies leading to higher debt levels? This paper will analyse whether there is a correlation between the level of democracy and the level of economic development on one hand and public debt on the other.

The paper studied the "Three-D-Relationship", the interplay between democracy, development and debt. The research hypothesis was: the more developed the democracy and the more developed the economy in terms of the GDP leads to higher public debt. To test this hypothesis, two-way analysis of variance and Tukey methods of multiple comparisons of means were used for studying 91 countries during the period from 2012 to 2016. The period has been limited by the availability of comparable data for the tested variables.

2 LITERATURE OVERVIEW

In the focus of the paper lie the triangle of variable, "democracy-development and debt" and their mutual interplay. All three variables represent the core economic parameters determining the quality of life in society and all of them are undergoing dynamic developments. The paper will analyse how democracy on one hand and the economic development as expressed by the GDP per capita influences the public debt of a country.

The democracy variable refers to the type of political regime in which people in various countries live. The Economist Intelligence Unit (2017) distinguishes five categories of states based on electoral process and pluralism; civil liberties; the functioning of government; political participation; and political culture and classifies all countries in one of four types of regime, "full democracy"; "flawed democracy"; "hybrid regime"; and "authoritarian regime". It observed that in 2016, almost one-half (49.3%) of the world's population lives in a democracy of some sort and around 2.6 billion people, more than one-third of the world's population, live under authoritarian rule. Regarding the developments of democracy, it notes the year-to-year decrease of "full democracy" from 8.9% in 2015 to 4.5% in 2016. Puddington and Roylance (2017) are noting the recent dynamic where in 2016 a total of 67 countries suffered net declines in political rights and civil liberties compared with 36 that registered gains. They noted the 11th consecutive year in which democratic declines outnumbered improvements.

The development can be expressed in a narrow sense by the GDP change. The world economy is experiencing a clear increase of GDP. According to the World Bank (2017), GDP at purchaser's prices in current U.S. dollars has risen from 1.4 trillion in 1960 to 75.5 trillion USD in 2016.

For the debt in this paper, we consider the public debt only: which can be defined as the general government debt-to-GDP ratio, i.e. the amount of a country's total gross government debt as a percentage of its GDP. The debt level is steadily growing. According to the World Bank (2017a), the debt has risen from 41.4% in 1991 to 93.9% of the GDP in 2015 for the sum of the governments in the world.

The literature about the "triangle variables" is rich, both individually and mutually. However, the papers deal typically with the combination of pairs of the variables and not on all three of them at the same time.

Firstly, on the relation between "democracy-debt", there is both a pessimistic and an optimistic perspective to whether democracy leads to smaller public debt or not. The pessimistic school of thinkers expects democracy to increase the debt. For them, the critical point was the rule of mass which could tend to redistribute the wealth and to spend more public money for more collective-like purposes and debt would be the price for such a policy.

This prediction was done by earlier authors. Plato (360 BC) expected the democratic elites to have the tendency for transferring wealth from wealthy individuals to themselves and eventually to the rest of the society. Madison (1865) who serves as a one of the US founding fathers warned that democracy could lead to debt accumulation due to the inadequate egalitarian policies connected with a pro-inflation policy to eliminate the debt burden. Hume (in Miller, 1987) warned that public debt is undermining the state sovereignty by limiting the public policy decision-making and transferring it to the private agent of financial sector. The pessimistic position was expressed by Howe (1905) who noticed that the public policy was a failure in democracies due to the decision making mechanism of the majoritarian and representative form. On the other hand, it can easily be argued that the authoritarian regimes are not any better with only a limited control and are vulnerable to corruption, ruling class enrichment and eventually shifting the negative externality of underperforming economy to the debt increase.

An important contribution to the academic discussion on public choice theory was provided by Buchanan (1990). People's choices and preferences are expressed by voting. Forms of expressing opinions to policy makers based on individual interest and are primarily selfish. MacLean (2017) disagrees with Buchanan's view that economic freedom contradicts political liberty. Both points of view highlight the complex relations in societal preferences, including public debt.

In more detail, the interaction between democracy and debt was evaluated by Schragger (2012) who followed the pessimistic path. The possible reason for him as to why democracy does not lead to debt decrease is that the public sector favors spending policies because of the policy failures (corruption or special interests) or because of the inherent characteristic of the democracy, the will of a majority. His policy advice is to follow the market signals for borrowing and subsidies reduction. Lav and McNichol (2011) are also noting the democratic tendency for debt creation due to public costs of healthcare and education which are together responsible for up to half of the state budgets and a third of local budgets. Krugman (2011) is commenting the opposite aspect of democracy-debt relation and concludes that high public debt generates pressure from creditors which has undermined the democratic processes. Balkan and Greene (1990) analysed around 100 countries in the sample period from 1976 to 1983 and came to the conclusion that the relation between democracy and public debt was unclear and statistically not significant.

On the other hand, there is positive evidence from the literature which clearly link the democracy with the concept of good governance. Here, the literature provides for a large consensus on the positive impact of good governance to the economic development and sound fiscal stance. Bartolini and Santolini (2017), studied the capacity to implement policies that address citizens' preferences. On the sample of 80 democratic countries over the period 1996–2011 they found out that "the performance of the government depends on the interaction between electoral rules and political regimes". Good governance or "government effectiveness" is therefore seen by Rindermann et al. (2015) "as a critical factor for the wealth of nations insofar as it shapes political and economic institutions and affects overall economic performance". Respect for political and participatory rights of citizens is widely accepted as being part of good governance (Neumayer, 2002). More specifically on the interaction between the "good governance" and "development", Nanda (2006) looked at the conditions on which the donor countries assessed their decision to provide economic aid. His research was conducted on data of 1980s and 1990s and concluded that donors tended link their support conditional to good governance and reforms effort in the recipient countries. Good governance included political stability, the rule of law, control of corruption, and accountability. The literature provides well proven evidence that the good governance has positive effects on debt levels. Alt and Lassen (2006) looked at one particular component of good governance, namely transparency. They showed on the basis of an anal-

ysis of 19 OECD countries that "fiscal transparency leads to substantially lower deficits and debt accumulation". Similarly, Boysen-Hogrefe (2017) concluded from her research of the euro area debt crisis that markets and international donors observed closely the governance quality of the countries which experienced fiscal challenges. Paradoxically, the lack of "good governance" has been rewarded. For instance, Neumayer (2002) found out that "in the past debt forgiveness has not been used much to reward countries with good governance" and he suggests that this practice should be discontinued. In the same line Dijkstra (2018) concluded that external aid can have negative impact on good governance by weakening domestic accountability and support for authoritarian regimes and increase corruption.

North and Weingast (1989) referred to such a democratic advantage in terms of access to debt and its pricing due to the greater credibility of democracies to creditors and their higher level of institutional control mechanisms. Archer et al. (2007) studied this question in fifty developing countries during the period 1987–2003. They came to the conclusion that democracies had no advantage over the authoritarian regimes in terms of more favorable ratings from the major credit rating agencies. Beaulieu et al. (2012) however confirm that there is a democracy advantage related to the debt. For them, this is due to the higher willingness of the creditors to purchase the debt of democratic countries rather than more favorable debt pricing compared to the non-democratic countries debt.

Authors also noted the country specificities in the debt-democracy relation. Frieden (1991) documented in the case of the countries of Latin America in the period of 1970s and 1980s on their individual approach to high debt levels irrespectively whether they were democracies or authoritarian regimes.

Some democratic countries offered solutions to the high-debt levels. One of them is the introduction of the constitutional breaks for spending. These are applied for example in the US or in the EU. Schragger (2012) is however sceptical of the possibility of the constitutional limitations of debt as borrowing. He sees it primarily as a political not a legal issue. For him, it can lead to adoption of inefficient means of spending policies and often pro-cyclical ones and fails to depoliticize budgetary decisions. It also challenges the democracy operation though the problem of intergenerational equity. On the other hand, Feld and Kirchgässner (2001) do not share this scepticism towards the constitutional restrictions on debt levels and legal rules of the budgetary process, such as a strong role of the Minister of Finance, as they are helping against the debt bias inherent in political decision-making procedures in democracy.

Another solution for debt management in democracies comes from the direct democracy case. Authors are positive about the Swiss experience. Feld and Kirchgässner (2000) refer to the political culture in Switzerland where citizens are well informed and politicians have less leeway to pursue their personal interests. As a consequence, public expenditure and public debt are lower when citizens enjoy direct democratic rights. Citizens also feel more responsible for their community: tax evasion is lower in direct than in representative democratic systems. His argument is supported by Pommerehne and Schneider (1985) who showed for 110 Swiss cities in the period of 1968 to 1972 that expenditure growth in cities with direct democracy was almost three percentage points lower than in representative democracies and cities in Switzerland which enjoy direct democracy. Also Feld and Kirchgässner (2001) investigated a positive impact of fiscal consolidation through referendum approval of budget deficits by the voters on the level of public debt in 134 largest Swiss municipalities in 1990.

Jalles (2011) highlights another aspect of the democracy-debt relation, the quality of governance and control of corruption. He tested the relationship between external debt (borrowing opportunities/constraints) and economic growth of 72 developing countries in the 1970–2005. Low corruption states were able to have lower public debt when compared to the countries with higher corruption levels.

Secondly, on the relation between democracy and growth. This subject enjoys high scholar attention and it was looked at from both perspectives: on how economic development influences democracy and vice versa. Varshney (1999) suggests from his study based on the developing countries that democracy did not stimulate the alleviation of poverty. Notably, the poverty reduction is affected by development increase and redistributive policies. Lipset (1959) concluded from his research that prosperity stimulates democracy. Therefore, the improvement of economic development tends to lead to gradual rise in democracy. On the contrary, democracies with low economic development do not generally persist. Barro (1996) analysed a group of about 100 countries in the period from 1960 to 1990. He identified variables positive to growth, such as rule of law, free markets, low government consumption and human capital. Interestingly, the effect of democracy on growth was weakly negative. He suggested a nonlinear relationship in which more democracy enhances growth at low levels of political freedom but suppresses growth when a moderate level of freedom has already been attained. He explains that the development level increases the probability that political freedoms will grow. But the negative effect of democracy on growth might be caused by the wealth redistributions of the rich in democracies. Authoritarian regimes may partially avoid this tendency. However, the specific type of dictatorship may heavily influence the growth pattern. Wucherpfennig and Deutsch (2009) confirm the existence of economic bias for the creation and viability of a democracy. Li and Leung (2015) concluded from her study, based on the example of China, that there is no consensus on the correlations between democracy and economic growth.

The debt-growth relation, third and final, once again does not receive a clear reply from the academic literature to the question whether high level of economic development (or a proxy of that question, namely high economic growth) lead to high public debt levels. According to our knowledge the literature offers research on the mirror question which is whether high public debt is slowing the economic growth. On this question, Kumar and Woo (2010) found that *"on average, a 10 percentage point increase in the initial debt-to-GDP ratio is associated with a slowdown in annual real per capita GDP growth of around 0.2 percentage points per year, with the impact being somewhat smaller in advanced economies."* Reinhart and Rogoff (2010) investigated on this question 44 countries (20 developed and 24 emerging market economies) during 1790–2009. For developed counties the average growth in economies with higher debt levels (above 90% GDP) was 1.7% versus 3.7% when the debt was low (under 30% of the GDP). An even stronger pattern was observed for emerging economies. The author therefor concluded that high debt/GDP levels are associated with notably lower growth outcomes. Similarly, Szabó (2013) found out from his research on the 27 European Union members that a one percentage point increase in the debt to GDP rate causes a slowdown of 0.027% on the economic growth. For the 10 states which entered the European Union after 2004 such an effect is higher (0.041%). He came to the conclusion that the optimal rate of sovereign debt to GDP for the economic growth was 68% in the years preceding the economic crisis and 86% by 2012. On the other hand, other authors draw attention to the fact that the relation is not a linear one. Other research of this question is is less conclusive. Égert (2012) on the same question concluded *"that finding a negative nonlinear relationship between the public debt-to-GDP ratio and economic growth is extremely difficult."* Checherita and Rother (2010) found out that public debt has an optimal level, under and over this level there is a negative effect the economic growth. In conclusion, there is a research evidence of a fact that higher debt levels tend to be associated with lower economic growth. However, on our inverse question the research is missing.

3 DATA AND METHODS

The analysis was run for 91 countries for which there was a complete set of data available: Albania, Antigua and Barbuda, Australia, Austria, The Bahamas, Bahrain, Barbados, Belarus, Belgium, Belize, Bhutan, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Colombia, Croatia, Cyprus, Czech Republic, Denmark, Dominica, El Salvador, Estonia, Ethiopia, Finland, France, Georgia, Germany, Greece, Grenada, Guatemala, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Italy, Jamaica, Japan, Kazakhstan, Korea Republic, Kyrgyz Republic, Latvia, Liberia, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Marshall Islands, Mauritius, Micronesia Fed. Sts., Moldova, Namibia, The Netherlands, New Zealand, Nigeria, Oman, Palau, Papua New Guinea, Peru, Philippines, Poland, Portugal, Romania, Russian Federation, Samoa, San Marino, Seychelles, Singapore, Slovak Republic, Slovenia, Solomon Islands, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Swaziland, Sweden, Switzerland, Thailand, Tunisia, Turkey, Ukraine, United Arab Emirates, United Kingdom, United States, Uruguay, Zambia.

Statistical method used in this paper was a two-way analysis of variance (ANOVA) that examines the influence of two different categorical independent variables on one continuous dependent variable. The reason for choosing this method is also the fact that it allows to assess not only the main effect of each independent variable but also if there is any interaction between them. Therefore, we assume the following model:

$$y_{ij} = \mu + \alpha_i + \beta_j + \gamma_{ij} + \varepsilon_{ij}, \qquad (1)$$

where the dependent variable y_{ij} is debt, μ is the total mean, α_i is the additive main effect of level i from the first factor (income level), β_j is the additive main effect of level j from the second factor (level of democracy index), γ_{ij} is the non-additive interaction effect of treatment from the both factors and ε_{ij} is the error terms.

For the purpose of our analysis, the debt was expressed as the mean of the percentage ratio of a central government debt level-to-GDP for the years from 2012 to 2016. It represents the stock of direct government fixed-term contractual obligations. The data used for the debt values was taken from the World Bank database (2017). The time-period limitation for five years was chosen to ensure the robustness of the statistical analysis.

The factors for our analysis are income level expressed as GNI per capita in US$ based on Atlas methodology of World Bank and the democracy index compiled by the Economist Intelligence Unit (2017). Concretely, we have established four categories for the income level (see Tab. 1). The division of analyzed countries into individual categories based on income level by GNI per capita in US$ is then included in the Tab. 9 in the Appendix.

Tab. 1: Income level by GNI per capita in US$ (Atlas methodology)

Income Level	GNI per capita in US$
Low income	≤ 1005
Lower middle income	1006–3955
Upper middle income	3956–12235
High income	≥ 12235

Source: World Bank (2017)

We are aware of a possible issue of correlation between the debt and the income variables due to the GDP parameter which is underlining for both of them. However, the approach taken eliminates this problem as the income is expressed in GNI and on top of it the income levels are analysed in the four groups of states and not the GNI directly.

In addition, GDP could be considered instead of GNI as a factor for the two-way analysis of variance. However, in the most of analyzed countries, those two figures are very close ($\pm 5\%$). The reason is the fact the difference between incomes received by the country versus payments made to the rest of the world is not significant. Therefore, if we considered GDP instead of GNI as a factor in our analysis, the results obtained are very similar and will not be presented in this paper.

Similarly, four categories for level of democracy index based on Economist Intelligence Unit were used (see Tab. 2). The division of analyzed countries into individual categories based on level of democracy index by regime type is then included in the Tab. 10 in the Appendix.

Tab. 2: Democracy index by regime type

Category	Score of Democracy index
Full democracies	$8 \leq s \leq 10$
Flawed democracies	$6 \leq s < 8$
Hybrid regimes	$4 \leq s < 6$
Authoritarian regimes	$0 \leq s < 4$

Source: The Economist Intelligence Unit (2017)

The literature overview mentioned above offers an insight on the mutual relation of each of the pairs of the triangle of variables of democracy-development-debt. The relationships and causality are in many ways not straightforward and depend on specific circumstances. Some of the studies offer contradictory conclusions. In addition, studies focusing on the interplay of the triangle of all three parameters democracy-development-debt were not available to us.

4 RESULTS

Three tests were run to confirm the research hypothesis. The first test was the two-way analysis of variance. Its outcome is summarised in Tab. 3. Based on our results we can conclude that the type of regime as well as the income level is statistically significant factors for the debt level, with a 5% significance level. However, the interaction between the type of regime and level of income is not statistically significant.

The results of the analysis of variance were also subjected to a statistical analysis of the suitability of the method. Based on the results of diagnostic tests (see Tab. 4 and Fig. 1) we can conclude the homogeneity of variance as well as normal distribution of residuals of analysis of variance, i.e. we can conclude that chosen method is correctly used, at 5% significance level.

Now we can focus on individual factors for which second and third tests will be used. Thus, the second test focuses on the type of regime. Tab. 5 presents the basic statistical characteristics for the debt based on the type of regime. We can see that a higher level of percentage ratio of debt have countries with full and flawed democracies. Similar results are also shown by Fig. 2 and 3.

Now we can focus on multiple comparisons of means. For this, we use the Tukey method of multiple comparisons of means. The results are presented in Tab. 6 and Fig. 4. From the results we can state that there are the statistically significant differences in the level of debt between full democracies and authoritarian regimes as well as between flawed democracies and authoritarian regimes, at 5% significance level. The other differences are not statistically significant.

Finally, we move to the third test focusing on the income levels factor. We can state that there is a statistically significant difference in the level of debt. Tab. 7 presents the basic statistical characteristics for debt based on income level. We can see that the highest level of percentage ratio of debt has countries with high and upper middle level of income. This is also visible from Fig. 5 and 6.

For the purpose of the multiple comparison of means we use again the Tukey methods. The results are presented in Tab. 8 and Fig. 7. From the results we can state that there is a statistically significant difference in level of debt between high level of income and lower middle income, at 5% significance level. The other differences are not statistically significant

Tab. 3: Results of analysis of variance for debt level (response: debt)

	Df	Sum Sq	Mean Sq	F value	Pr (>F)
Regime	3	18053	6017.8	5.7609	0.001301**
Income	3	16625	5541.7	5.3051	0.002219**
Regime:Income	6	4272	712.0	0.6817	0.664873
Residuals	78	81478	1044.6		

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '·' 0.1 ' ' 1

Tab. 4: Diagnostic tests

	Test statistics	p-value
Levene's test for homogeneity of variance	1.729	0.0763·
Pearson chi-square normality test	16.571	0.0844·
Lilliefors normality test	0.0881	0.0783·
Cramer-von Mises normality test	0.105	0.0939·

Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '·' 0.1 ' ' 1

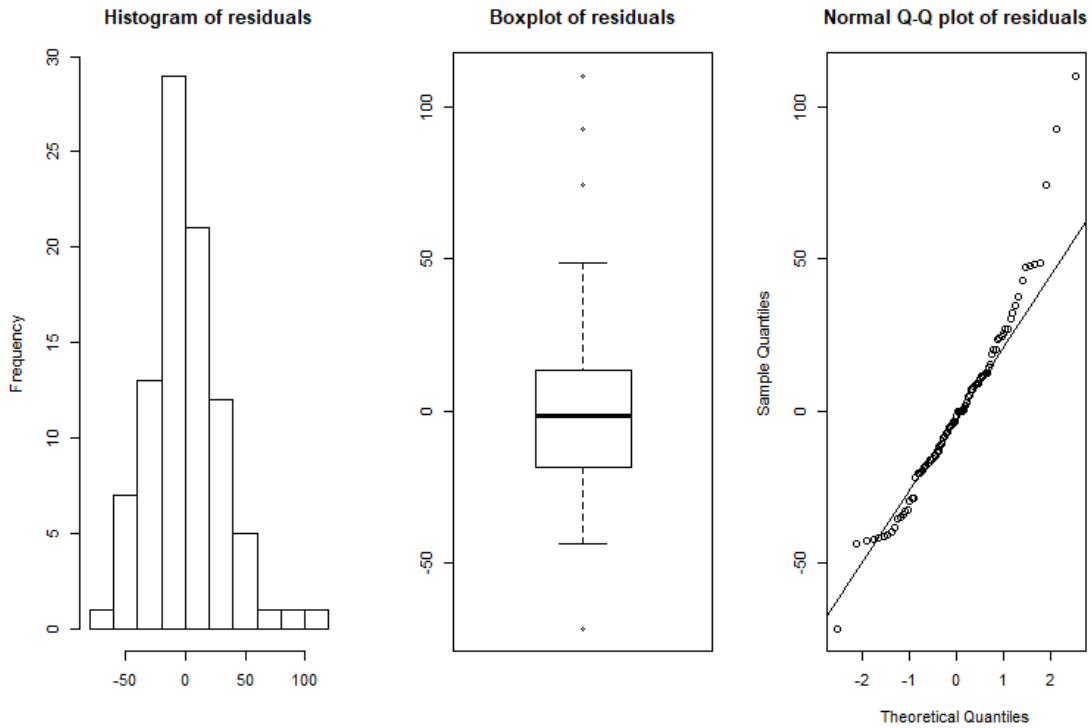

Fig. 1: Histogram, boxplot and normal Q-Q plot of residuals of analysis of variance

Tab. 5: Summary of debt (percentage to GDP) based on type of regime

	AUTH	FLAW	FULL	HYBRID	TOTAL
n	8	48	18	17	91
mean	16.23	65.50	61.48	49.57	57.40
median	12.17	53.75	54.54	37.50	48.83
min	1.89	10.00	20.85	10.46	1.89
max	43.94	192.38	110.95	127.93	192.38
sd	13.98	39.72	27.72	29.38	36.58

Notes: AUTH = Authoritarian regimes, FLAW = Flawed democracies, FULL = Full democracies, HYBRID = hybrid regimes.

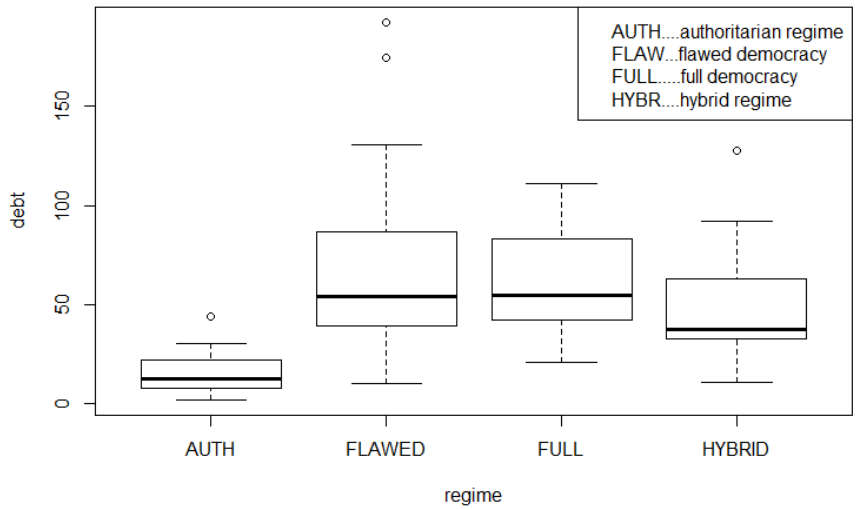

Fig. 2: Boxplots of debt vs. regimes

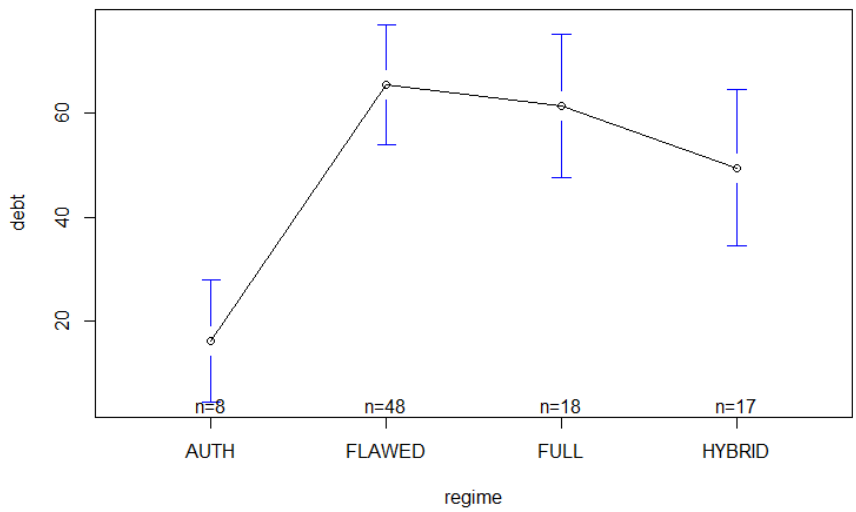

Fig. 3: Plot of means for type of regime

Tab. 6: Tukey multiple comparisons of means for type of regime (95% family-wise confidence level)

	diff	lwr	upr	p-value
HYBRID-AUTH	33.346544	−3.032469	69.72556	0.0842218•
FULL-AUTH	45.255925	9.201731	81.31012	0.0079131**
FLAWED-AUTH	49.274343	16.871826	81.67686	0.0008322***
FULL-HYBRID	11.909381	−16.786771	40.60553	0.6969393
FLAWED-HYBRID	15.927800	−8.019798	39.87540	0.3072410
FLAWED-FULL	4.018419	−19.432802	27.46964	0.9694682

Notes: AUTH = Authoritarian regimes, FLAW = Flawed democracies, FULL = Full democracies, HYBRID = hybrid regimes. Significance codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '•' 0.1 ' ' 1

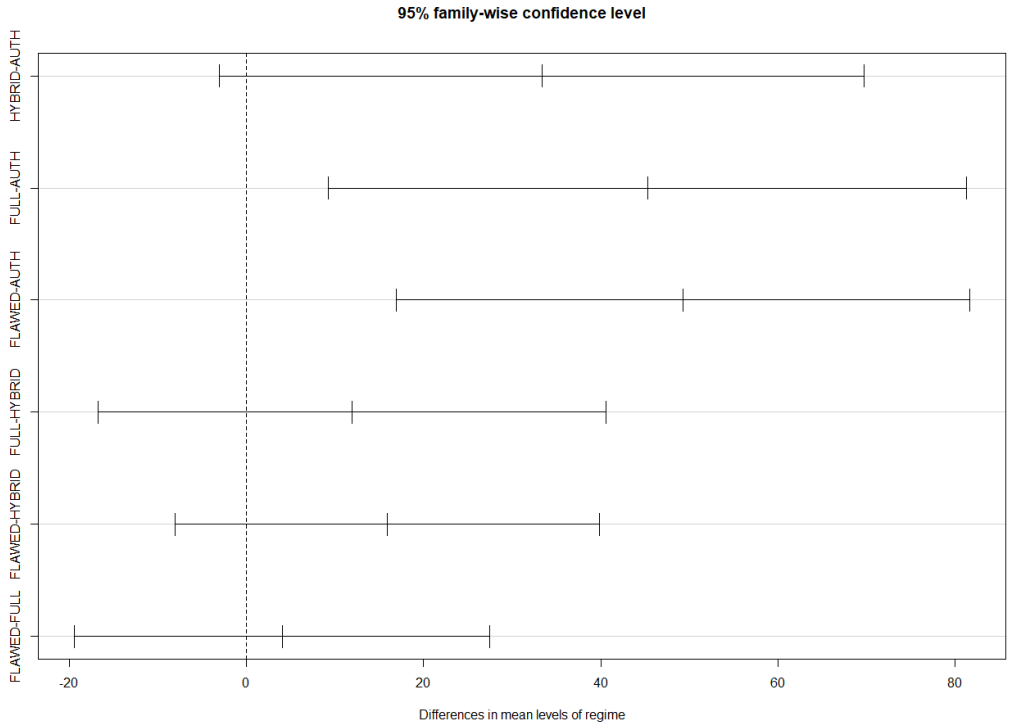

Fig. 4: Tukey multiple comparisons of means

Tab. 7: Summary of debt based on income level

	AUTH	FLAW	FULL	HYBRID	TOTAL
n	44	3	18	26	91
mean	71.18	28.67	39.78	49.58	57.40
median	62.38	32.68	36.44	49.35	48.83
min	1.89	10.73	10.14	11.29	1.89
max	192.38	42.60	91.75	130.80	192.38
sd	41.57	16.31	21.90	27.89	36.58

Notes: AUTH = Authoritarian regimes, FLAW = Flawed democracies, FULL = Full democracies, HYBRID = hybrid regimes.

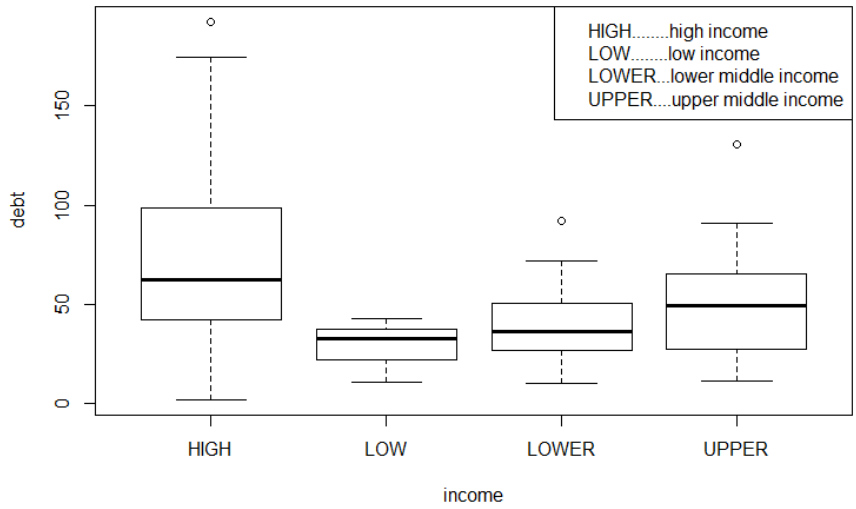

Fig. 5: Boxplots of debt vs. incomes (GNI per capita in US$, Atlas methodology)

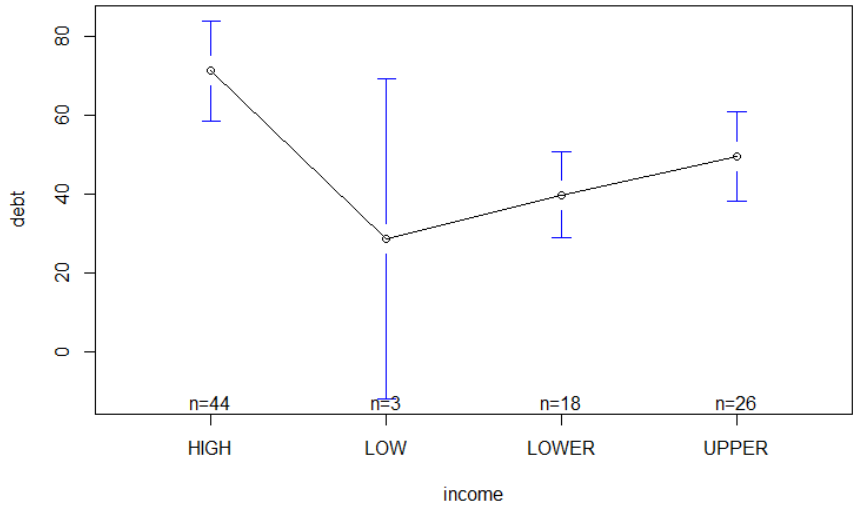

Fig. 6: Plot of means for income level

Tab. 8: Tukey multiple comparisons of means for income levels (95% family-wise confidence level)

	diff	**lwr**	**upr**	***p*-value**
LOW-LOWER	6.114489	−46.798601	59.02758	0.9902305
UPPER-LOWER	9.497609	−16.519185	35.51440	0.7733206
HIGH-LOWER	26.850929	3.110771	50.59109	0.0202755*
UPPER-LOW	3.383120	−48.353977	55.12022	0.9981864
HIGH-LOW	20.736440	−29.894072	71.36695	0.7055764
HIGH-UPPER	17.353320	−3.635420	38.34206	0.1405922

Notes: HIGH = High income, LOW = Low income, LOWER = Lower income, UPPER = Upper income.
Significance codes: 0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘·’ 0.1 ‘ ’ 1

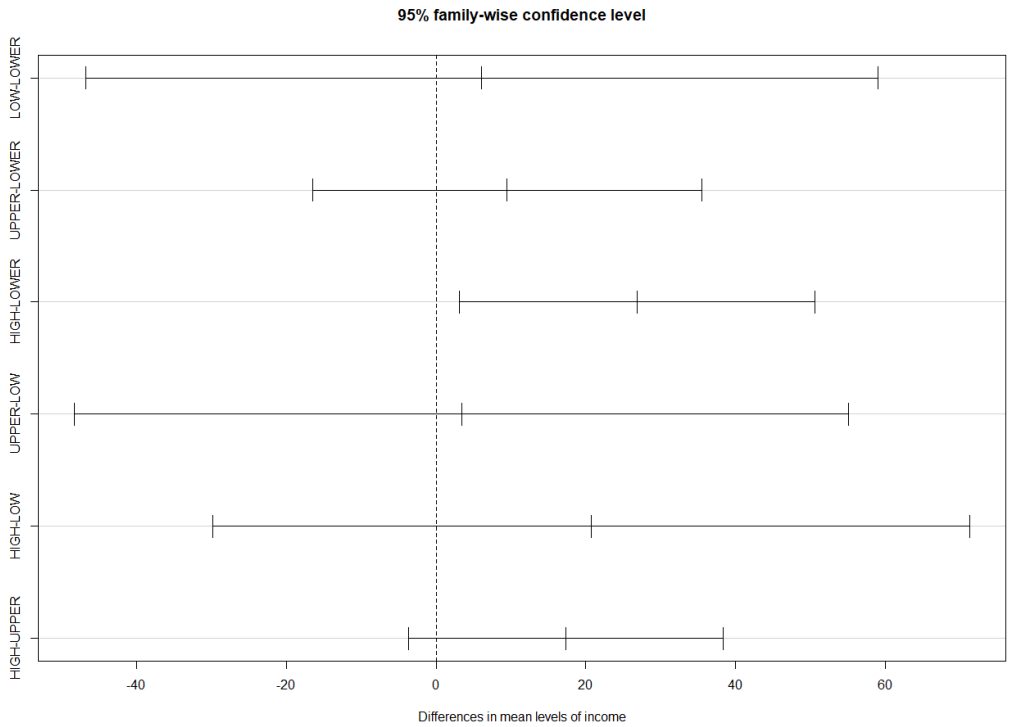

Fig. 7: Tukey multiple comparisons of means (HIGH = High income, LOW = Low income, LOWER = Lower income, UPPER = Upper income.)

(the number of observations for low level of income is very small).

Based on the chosen data and methods, the results confirm the research hypothesis for the individual effect of each of the factors (democracy, development), but not for both of them combined. Our test confirmed that in the panel of 91 countries during the 2012–2016 periods both income level and regime type statistically significantly influenced a higher level of debt. The interaction between the two factors (income level and regime type) was insignificant for debt levels. The results also show that debt level was higher for the countries with more democratic regimes and higher income levels compared to more authoritarian regimes with lower income levels per capita which had lower debt levels.

5 DISCUSSION AND CONCLUSIONS

The economic and political interpretation of the results should be done carefully and with limitations. The time-period is relatively short and the groups of countries contain geographically distant states. Each country has its own debt history based on the political and economic situation. Regarding the question about why democracies tend to produce more debt we can speculate on several possible replies. People in free choice countries might prefer to postpone the painful economic reforms to the future which can result in debt creation. Similarly, democracies tend to operate in short-term horizons making the structural reforms more difficult. Other factors, such as fiscal constitutions of the state, its monetary sovereignty, economic freedom, interest rates, corruption levels, institutional quality and others are for

sure elements which co-determine debt levels. In respect to our research it is worth noting that the "full democracies" contained several members of the European Union (such as Germany, UK, the Netherlands) and the "flawed democracies" included US, Italy, France, Brazil, India or the Visegrad 4 members while the "authoritarian regimes" group had Russia, United Arab Emirates, Belarus or Kazakhstan.

Nevertheless, our research confirmed the findings of Schragger (2012), Lav and McNichol (2011) and Archer et al. (2007). Some high-income democracies adopted a protection mechanism against high debts. One of them is the Swiss example of direct democracy which demonstrated that it could be able to reduce debt by the means of the educated choice of responsible votes, as supported by Pommerehne and Schneider (1985) and Feld and Kirchgässner (2000, 2001). Similarly, the Member states of the European Union adopted constitutional rules to prevent excessive public deficits which lead to high public debt levels (such as the Stability and Growth Pact and Treaty on Stability, Coordination and Governance in the Economic and Monetary Union). Clearly, individual countries follow their individual results based on political and economic specificities. Our results show that full democracies are related with higher debt accumulation can probably be addressed by a better education concerning civic and public issues.

On the development-debt relation, it was found that richer countries tend to have higher debts compared to lower income states. In our "high income" group we had most of the European Union members, US, Japan, Korea Rep., Australia or United Arab Emirates. The "upper income" group was composed by the countries like Russia, Belarus, Turkey, Iraq or Peru. The "lower incomes" were represented among others by Ukraine, India, Philippines or Kyrgyz Rep. and finally the "low income" by Ethiopia, Liberia and Malawi. Why richer countries tend to accumulate more debt than the poorer ones is a challenging question and our research does not provide answers to it. One can think about the historical factor where most of the rich countries suffered from the oil crisis and created huge debt since. On the other hand, many formal soviet-bloc states which are mainly part of the second income group operated in closed economies, profited from cheap resources and had only a limited free trade. The lower and low income countries might also tend to use financial means available as their population is used to the given welfare levels. One cannot exclude the role of the "enlightened" rulers who do not allow high debt on political or economic ground.

Putting the results in perspective to the results of literature, the first aspect to be noted is that the results of the study are not directly comparable with literature results for the reason of the research hypothesis. The main difference is the fact that our research studied two independent variables (democracy and development) and their impact on debt levels. In the literature, the relation is typically mono-variable. In addition, authors were researching another direction than we were, namely whether high public debt leads to lower economic growth. Such hypothesis was confirmed by Kumar and Woo (2010), Reinhart and Rogoff (2010) and Szabó (2013). Other authors, such as Checherita and Rother (2010) and Égert (2012), provided to this question more nuanced reply. However, on the inverse question whether high economic development levels lead to higher debt the research is missing.

We try to fill this gap in research by the above analysis which can be seen as our contribution to the contemporary research. However, the results obtained should be interpreted cautiously and we would call for more research in the area, including on the possible reasons why democracy and development – two positive things – tend to produce high debts.

In summary, the paper aimed at confirming the "Three-D-Relationship" research hypothesis that more democratic and more economically developed countries exhibit higher public debt. This hypothesis was tested in a panel of analysis for 91 countries over the period from 2012 to 2016 and was confirmed for the each of the factors individually but not combined together.

The two-way analysis of variance confirmed that both income level and regime type statistically significantly cause a higher level of debt,

meaning that more democratic states as well as more high-income countries exhibit higher debt levels. However, the interaction between the income level and regime type had insignificant for debt levels. The results also show that debt level was higher for the countries with high more democratic regime and higher income level compared to more authoritarian regimes and lower income levels per capita which had lower debt levels.

The results suggest the rather challenging conclusions that higher democratic standards lead to higher public debt which can call on specific policy actions.

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8 ANNEX

Tab. 9: List of the countries under the analysis divided by GNI per capita in US$

High: Antigua and Barbuda, Australia, Austria, The Bahamas, Bahrain, Barbados, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea Republic, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Oman, Palau, Poland, Portugal, San Marino, Seychelles, Singapore, Slovak Republic, Slovenia, Spain, St. Kitts and Nevis, Sweden, Switzerland, United Arab Emirates, United Kingdom, United States, Uruguay
Upper: Albania, Belarus, Belize, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Colombia, Croatia, Dominica, Grenada, Iraq, Jamaica, Kazakhstan, Malaysia, Marshall Islands, Mauritius, Namibia, Peru, Romania, Russian Federation, Samoa, St. Lucia, St. Vincent and the Grenadines, Thailand, Turkey
Lower: Bhutan, El Salvador, Georgia, Guatemala, India, Indonesia, Kyrgyz Republic, Micronesia Fed. Sts., Moldova, Nigeria, Papua New Guinea, Philippines, Solomon Islands, Sri Lanka, Swaziland, Tunisia, Ukraine, Zambia
Low: Ethiopia, Liberia, Malawi

Tab. 10: List of the countries under the analysis divided by democracy regime

Full: Australia, Austria, Denmark, Finland, Germany, Iceland, Ireland, Luxembourg, Malta, Mauritius, Netherlands, New Zealand, San Marino, Spain, Sweden, Switzerland, United Kingdom, Uruguay
Flawed: Antigua and Barbuda, The Bahamas, Belgium, Botswana, Brazil, Bulgaria, Colombia, Croatia, Cyprus, Czech Republic, Dominica, El Salvador, Estonia, France, Greece, Grenada, Hungary, India, Indonesia, Italy, Jamaica, Japan, Korea Republic, Latvia, Lithuania, Malaysia, Marshall Islands, Micronesia Fed. Sts., Namibia, Palau, Papua New Guinea, Peru, Philippines, Poland, Portugal, Romania, Samoa, Seychelles, Singapore, Slovak Republic, Slovenia, Solomon Islands, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Tunisia, United States
Hybrid: Albania, Barbados, Belize, Bhutan, Bosnia and Herzegovina, Georgia, Guatemala, Iraq, Kyrgyz Republic, Liberia, Malawi, Moldova, Nigeria, Thailand, Turkey, Ukraine, Zambia
Auth: Bahrain, Belarus, Ethiopia, Kazakhstan, Oman, Russian Federation, Swaziland, United Arab Emirates

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CORPORATE GOVERNANCE AND RISK BUNDLING: EVIDENCE FROM INDIAN COMPANIES

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ABSTRACT

Corporate Governance has acquired a significant place in the national economies globally. Quality of governance impacts the business confidence index and resource mobilizations in the global marketplace. In various countries there is a conventional dominance of promoters or majority shareholders on the board of companies which implicates various propensities of risks and forms of risk cultures, making the problem of governance typical and critical for the regulators. Our paper examines the risk behaviour of firms in context of CG practices and creates distinct bundles of companies with specific risk cultures. Using a sample of 10 years' panel data of 84 companies listed on the National Stock Exchange in India (NSE) for selected risk and CG variables, we measure the influence of CG measures on the risk propensity and behaviour and based on combinations of selected CG practices formulated the risk bundles. Based on the derived bundles of risk behaviour, regulators and policymakers can make informed decisions.

KEY WORDS

corporate governance (CG), risk propensity, board structure, board process, CG variables

JEL CODES

G18, G34, K2, O16

1 INTRODUCTION

Corporate Governance (CG) is an area of concern for all economics in the current dynamic environment. Corporate Governance (CG) has also become a matter of worldwide political debate. The issue of corporate governance has acquired importance because corporate enterprises issue closely netted in the national economic system and have close interactions with international bodies. Their actions, therefore, carry importance to the strategic positioning of businesses.

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Quality of Corporate Governance has direct implications for various stakeholders, policy-makers, government, economy and society at large (Cadbury, 1992). System of CG in developed economies has evolved gradually through centuries but emerging economies like those in BRICS, the CG systems are to develop and they are still inadequately defined compendium of public institutions, laws, regulations, political and ethics codes (Gupta and Singh, 2018). Governance has direct impact on the resource mobilization (Hu, 1995) in domestic or international market and possibly stimulate employment and economic growth (Arestis et al., 2001; CIPE, 2002).

In the current volatile and uncertain environment, we find that evolving a structure of good CG has become difficult by problems like corporate ownership structures that are complicated, indefinite and obscure relationships between the financial sectors and the state, feeble regulatory arrangements, underdeveloped institutions and limited human resource potential. In various national CG codes, the issue of risk governance within the CG framework are mainly dealt by incorporating provisions in the listing agreements like in case of New York Stock Exchange (NYSE) listed company rules, French AFEP-MEDEF and UK codes. Much emphasis has also been laid on risk disclosure and a part of board disclosure on governance.

In a CG framework there are instances of conflict of interest in various groups of stakeholders that need to be addressed in a balance way (Fidrmuc et al., 2006) at the organisation level and policy level. The broader views on CG presented by Cochran (2015) focuses on the impact of decisions of senior management on various stakeholder's groups. The study of corporate governance can involve a wide range of problems ranging from strategic management, behavioural sciences, macroeconomics, competition and international business in the framework of corporate decision making and legal and regulatory environment (Babić, 2010). The recent financial crisis mainly attributes to the risk management failure primarily due to the separation of risk managers from management without due emphasis on its linkage to the corporate strategy. The study of problems of corporate decision making in context of risk management and governance for non-banking firms is relatively new in developing countries like India.

A nexus between the board remuneration and risk flows has been thoroughly examined by OECD (2011) which illustrates how the integration of risk management and remuneration of senior management should take place which can be achieved by dual memberships in risk committee and audit committees. Active involvement of shareholders can better the monitor the board functioning and its risk taking. There is well established notion that corporate board should set the risk appetite for the firm. We argue that to achieve integration of CG and risk governance, an examination of factors on the CG side can throw a light on the risk propensities which will then be easier to model.

In countries like India, there have been several attempts to imbibe the evolving CG codes with a series of legislative promulgations and constitution of regulatory authorities. However, corporate frauds are growing. Gupta and Gupta (2015) have argued that various KPMG surveys the fraud risk is persisting in the business structures persisting on continuing basis. To quote, frauds connected with Punjab National Bank, Gitanjali Gems, ILFS, IDBI Bank etc. highlight the poor risk governance within the framework of CG in an Indian context. These frauds question the effectiveness of macro-economic policy framework. The risk governance being an integral part of CG, therefore, requires a special consideration.

Recent events like China devaluation of currency, Brexit, US Elections, Demonetization in India have forced the business organizations to think strategically. We observe an altogether transformation of the business models and new value propositions on the risk-return continuum. On various fronts like e-business, the organizations are willing to observe new risks. There are dramatic changes in the business and financial environment like volatile and declining interest rates, global problem of credit defaults and haphazard liquidity which accentuated the

corporate boards to assume higher risks. The questions before the stakeholders particularly shareholders and regulators are whether the risk-taking behaviour is optimal. This raises questions as to whether the propensity to take risk is governed by the various CG parameters especially the board structures, professional capabilities and compensation structures. A host of regulators like SEBI, RBI, IRDA, various ministries are in fix sometimes to the problems that emanate from the corporate actions. It is therefore motivating to conduct a study of the Corporate Governance variables affecting the risk behaviour of Indian companies. Large numbers of studies have been conducted on a global basis to examine the corporate governance levels and their effectiveness. Our study is first of its kind that attempt to find out the risk propensity using the selected corporate governance variables.

2 REVIEW OF LITERATURE

Corporate Governance in the literature has been extensively explored globally in recent times from various perspectives. The studies include the disclosure aspects, valuation, firm performance and rating of firms. Authors have attempted to link the quality of CG with the financial performance and stock market returns (valuation). Studies have established that the market strongly supports good governance practices and the resultant of the strong shareholder rights is higher stock pricing (Toudas, 2008). CG practices and firm's performance are positively related (Kowalewski, 2012) and a progressive association between the market value of the firm and total corporate governance scores exists according to Ficici and Aybar (2012). Bistrova and Lāce (2012) examination of Central and Eastern European companies shows that stock price risk after implementing quality CG practices. The seminal work of Aguilera et al. (2008) focuses on the presence of mechanisms which ensure that executives take due care of the stakeholders' interests and ensure that stakeholders take due responsibility of the firm's wealth generation and distribution.

Haji-Abdullah and Wan-Hussin (2009) study of UK non-financial companies' governance structures reflects the emphasis on CG by the investors when they are building their investment portfolios. The cost of corporate governance mechanism implementation is offset by higher market returns (Ammann et al., 2013). The linkage between executive compensation and governance has been explored by various researchers. One school of thought says that directors may not act independently to be in their positions if the level of compensation is high (Core et al., 1999; Stewart, 2003). Contrarily, some researches show that attractive compensation improves the supervising function of the board like Becher et al. (2005), Adjaoud et al. (2007), etc. Aboudou (2016) work on the listed companies of West African Monetary Union (WAMU) by reveals that size and structure of the board plays a critical role in the performance of a company. Accordingly, a larger board size impacts the firm's performance negatively affected by a lag in decision making affected by the diversified opinions. Kiesewetter and Manthey (2017) find a positive relationship between effective tax rates and value generation that for firms that exhibit low social and environmental characteristics and a stronger corporate governance level in lower tax rates market economies with a liberal posture. Studies have also examined the convergence of CSR and CG. Harjoto and Jo (2011) establish that better CG leads to a sense of CSR thus improving a firm's performance and sustainability. A similar linkage is also proposed by Sharma et al. (2019) in an Indian context.

Whereas a large number of studies emphasise the relationship between CG and financial performance of firms and their stock returns, our focus is on the emanating variability of returns and the risk posture of firms. Typically, authors have defined firm risk in terms of variability of returns and probability of corporate ruin (Bloom and Milkovich, 1998). Core

et al. (1999) have shown a strong negative relationship between firm risk and performance. Some authors like Lazear and Rosen (1981) relate the spreads between the remuneration of executives and non-executive members of the board have consequential impact on the risk behaviour. There is a significant research work in vogue that explore the connection between risk appetite and board compensation.

Balasubramanian et al. (2010) study on CG reforms adopted by India in 2000 and their subsequent effects on the firm's valuation suggest a positive impact on stock prices of large firms compared to small firms. Sarkar et al. (2012) study the impact of Corporate Governance measures on the company's performance by analysing Information regarding the Board of Directors, audit committee, external auditors, and ownership configuration and establish rise in the adoption of corporate governance practices by the large firms listed in India post-2008. The creditworthiness of companies to financial institutions has increased by following effective corporate governance practices (Mishra and Mohanty, 2014). Similarly, Subramaniam et al. (2009) conclude that public and private sector companies follow a comparable outline of disclosure for financial transparency and information disclosure.

Bhasin and Shaikh (2013) work on the various CG practices that highlights that corporations follow less than half of the items exhibited in the CG disclosure index. Also, there is no significant difference among the disclosure scores across the industries and there has been a slight improvement in the CG disclosure though that remains below an acceptable level. Taruna et al. (2015) study of the annual reports of 100 companies for the period 2012–13 and 2013–14 shows that listed companies in India are following governance practices as per guidelines issued by SEBI in clause 49 of the listing agreement, which is intended to reveal mandatory and non-mandatory CG practices.

The size of boards of companies with a combined risk management committee and audit committee is larger than the one with spate departments, thus higher financial reporting risk and lower organisational complexity. We argue that the professional skills of the board may also affect the risk-taking process. The expertise of the board for example in financial decision-making may lead to lesser risk and well-informed decisions. Skill sets of the members of board is linked to corporate risk-taking (Chhaochharia and Grinstein, 2007). The firms where the remuneration of board is linked to the financial performance, there is tendency on part of the board to take excessive risks. Tao and Hutchinson (2013) have examined how the compensation and functioning of risk committees affects the risk behaviour of firms based in Australia during the global financial crisis period (2006–2008). They find strong positive association of risk with composition of the risk and compensation committees. Joint membership of a board member in risk and compensation committee reduces information asymmetry. The importance of independent risk management function along with CG structure has been emphasised by Ellul (2015).

Thrikawala et al. (2017) work on MFIs reveals the need for further studies in emerging economies for understanding the impact on improvement in governance practices on sustainability and outreach. Colares Oliveira et al. (2016) have highlighted the quantum of adoption of 52 CG practices recommended by UNCTAD in 2009 for BRIC countries. The position of India is relatively low. A series of CG reforms have been introduced in India in the recent past. The effective implementation of CG in the present legal and regulatory framework appears to be a challenge in India. Saravanan (2012) has shown that the value of a corporate is enhanced by the adoption of corporate governance reforms. The shareholders with majority stakes exhibit dominance on the political system in India. The returns on investments made in implementing the sound governance systems are invisible though there is an indirect impact on the business activities. Chakrabarti et al. (2008) argue that the recent CG norms, policies and procedures have been established mainly due to the increasing cases of corporate scams and misappropriation of money and management. They highlight the

need for the formation of a different government committee to understand reasons for the failure of CG in listed companies so that a robust mechanism could be developed. The development of a strong CG structure can protect the abuse of Minority shareholder's rights by better implementation and follow-up of the rules and the strategies. India regulatory system is weak with a multiplicity of regulators as indicated by many researches. Recent corporate frauds are sufficient to justify this phenomenon viz. Satyam Computers, PNB and IIL&FS.

The literature review shows that risk governance is an integral part of the Corporate Governance process. There is large evidence from researches on developed countries to establish the fact the risk behaviour is influenced by the corporate governance parameters like board composition, size, remunerations, risk committee, conflicts, and professional skills. In addition, a number of studies have been conducted on financial institutions' risk-taking behaviour before and after the crisis. The studies on CG using varied methodologies that include regressions, scoring methods, neural networks and fuzzy models majorly discuss the CG parameters that impact a firm's financial performance. But there seems to be missing research on issues of CG and risk behaviour relationships in the case of Indian companies, which are complex and reflect a combination of all the themes listed by Srinivasan and Srinivasan (2011).

We find many unresolved issues in the Indian corporate world like (a) board professional acumen and risk propensity that drives the entrepreneurial intensity, (b) financial risk (including bankruptcy risk) that is a cause of primary concern to the recent governments, (c) problem of corporate frauds and failures shaking the legislators and regulators, (d) event-driven risk behaviour impacting the stock markets requiring reporting, administration and control by market regulators and (e) direct and the indirect response of the corporate world to policy changes. We are motivated to examine the influence of CG measures on risk propensity and behaviour which is a departure from previous studies. The idea is to explore the irrationalities in risk governance. We attempt to create bundles of selected companies on CG parameters and describe their risk cultures.

3 METHODOLOGY AND DATA

A review of the studies shows that the risk behaviour of the corporate sector has a direct influence on economic activity and national interests. During the period before and after the financial crisis and the major socio-economic and political events, the firms have exhibited a tendency to depict risk-taking behaviour that creates implications for regulators and society at large. In this paper, we have analysed the relationship between the CG variables and risk parameters. Using the inferences from McNulty et al. (2012) we define our CG and risk framework as follows (Fig. 1).

In order to examine how CG practices, impact the risk behaviour of sample firms, our study uses variables that have been classified as risk variables (factors) and variables of board effectiveness which are surrogates for CG practices. Risk variables cover the liquidity, investments and other business risk perspectives. Our endeavour is to evaluate the relationship between the magnitude of risk and board features, its structure and processes. Data on the constructs of board structure has been derived from the published financial and annual reports of selected companies and personal discussions with the practitioners and experts. In addition, informal discussions have also been carried with the executives of sample respondents. The structure of the study relates to the framework of Indian corporate laws particularly, Companies Act, 2013.

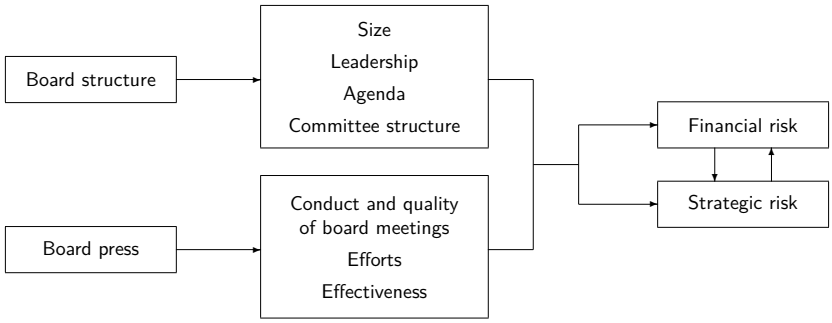

Fig. 1: CG Variables and Risk Dimensions

3.1 Description of Variables

3.1.1 Corporate Governance Variables

Following variables (determinants) of Board Effectiveness have been considered for the analysis:

- *Board size (BS)* is the total number of directors on the board and is associated with firm's performance and risk-taking (Huang and Wang, 2015; Akbar et al., 2017). Large boards are capable of taking more risks compared to small boards (Hermalin and Weisbach, 2003).
- *Board Effort Norms (BE)* is the aggregate measure (scale 0–100) for the conduct of audit committee meetings, investor grievance committee meetings, compliance with ESOP norms and considerations of gender diversity, and environment.
- *Board independence (BI)* has been measured on the basis of the proportion of the total number of independent directors on board as per Section 149 (4) of the Companies Act 2013. The section states that every listed public company is mandatorily required to have at least one-third of the total number of directors as independent directors. BI has an important influence on risk-taking (Minton et al., 2009; Ramasubramanian, 2017)
- *Board expertise and composition (BEXP)* is measured as the ratio of the number of non-executive professional directors to the total number of directors on board for the purpose of the study. The computed variable measures the relative risk-taking capability of non-executive professionals on the board. The "non-executive professional directors" are expected to contribute to the corporate affairs from their expertise and unbiased decision making (Pass, 2004; Sarkar, 2009).
- *Board power control (BPC)* has been analysed based on the overlapping role of the CEO and CMD (Chairman and/or Managing director) of the company. The presence of duality shows the intensity of power control (Tuggle et al., 2010). The BPC has been measured as a dichotomous variable with 1 denotes the presence of duality and '0' otherwise.
- *Remuneration dynamics (RD)* represents the degree and quality of compliance of members in the remuneration and nomination committee and the frequency of its meetings have been considered. It is a categorical variable and can take value from 0 to 1.

3.1.2 Risk Variables

The risk variable groups have been classified into two groups: (a) Financial Risk Group and (b) Strategic (Business) Risk Group.

Financial Risk Group

- *Liquidity risk 1 (LR1)* indicates the annual relative change in the proportion of cash and cash equivalents to total assets over a period of 12 months from 2010 to 2019.
- *Liquidity risk 2 (LR2)* indicates the percentage change in the difference of cash and short-term liabilities over a period of 12 months from 2010 to 2019. The rationale for taking percentage is to account for the size

of the variables which can vary across the companies of different sector.

- *Financial slack (LR3)* has been estimated as the summation of Cash and bank, 0.7 times accounts receivables + 0.5 times Inventory less Other Liabilities divided by net fixed assets similar to McNulty et al. (2012). The change in financial slack has been calculated over a periodic interval of 12 months from 2010 to 2019.

All the variables of liquidity have been used as inverse proxies of risk.

Strategic Risk Group

- *Business risk (BR)* has been defined as the Change in PPE. The incremental cash investment in property, plant and equipment scaled by total assets during the period 2010 to 2019. The incremental cash investments in new acquisitions are scaled by total assets for the sample period.

3.1.3 Control Variables

- *Risk Concern (RC)* used as dummy variable to represent the presence of risk committee in the company (if yes value is 1 or 0 if the committee does not exist).
- *Firm Size (FS)* has been calculated as natural Log of the total assets at the closing of the financial year (Dalbor et al., 2004).

3.2 Sample and Data

We have used the qualitative and quantitative data for the selected variables from the top 100 companies listed on the National Stock Exchange (NSE) for a period of 10 years from 2010 to 2019. The sample companies represent a diversified group of various industrial and service sectors that constitute more than 76.8% of the free-float market capitalization as of March, 2019. The list of companies is given in Tab. 6. We have conducted interviews with 12 respondents representing as members on the board of the sample companies and 63 company secretaries (head of legal and in charge of corporate law and compliance functions) of the NSE listed companies at their registered or head offices. The data on corporate governance variables have been derived from the published financial statements and websites of the sample companies. The sample period represents a stabilization after the financial crisis in 2007 and includes an important significant event i.e. promulgation of the New Companies Act, 2013. The role of independent directors has changed significantly after the new company legislation (Nishith Desai, 2014). However, considering the risk variables, this event does not affect the results and implications of the study. The data for finance and banking companies have to be excluded considering their nature of business and the sample period, especially after the global financial crisis. Therefore, 84 companies are finally selected for analysis (Tab. 6).

We have used pooled analysis combining time series (2009–19) for several cross-sectional data represented by the companies. Since the number of cross-section units is more than temporal units 'T', the pooled analysis is "cross-sectional dominant" (Stimson, 1985). Pooled ordinary regression is appropriate for the study as the tests a cross-section model of all firms through time (Pennings et al., 1999). The descriptive statistics of the variables are given in Tab. 1.

Sector wise descriptive statistics is given in Tab. 7.

Procedure

In the first instance, correlations and descriptives have been calculated for the corporate governance and risk variables. Then, a panel regression-based analysis has been carried out to examine the relationship between CG variables and risk variables. Finally, we have aggregated the results and formulated five distinct bundles of companies based on risk behaviour derived from the selected risk variables.

Tab. 1: Descriptive Statistics of Variables

Variable	Mean	SD	Minimum	Maximum	Unit root test ADF	Remarks
Dependent						
Liquidity Risk 1 (LR1)	−0.005	0.054	−0.392	0.279	407.46**	I(0)
Liquidity Risk 2 (LR2)	0.088	1.721	−2.738	10.989	413.63**	I(0)
Financial Risk (LR3)	−0.374	7.692	−10.664	6.343	386.60**	I(0)
Business Risk (BR)	−0.001	0.060	−0.720	0.444	356.32**	I(0)
Independent						
Board Size (BS)	0.852	0.198	0.000	1.000	297.68**	I(0)
Board Effort Norms (BE)	0.705	0.158	0.250	1.000	359.45**	I(1)
Board Independence (BI)	0.856	0.253	0.000	1.000	261.31**	I(0)
Board Expertise and Composition (BEXP)	0.768	0.312	0.000	1.000	449.91**	I(2)
Board Power Control (BPC)	0.698	0.459	0.000	1.000	117.98**	I(0)
Remuneration dynamics (RD)	0.926	0.137	0.000	1.000	174.56**	I(1)
Control variables						
Risk Concern (RC)	0.929	0.257	0.000	1.000	164.00**	I(2)
Firm Size (FS)	10.091	1.669	6.289	15.101	235.46*	I(0)

Notes: $^{***}p < 0.01$, $^{**}p < 0.05$

4 RESULTS

We have first computed the descriptives for the selected variables and constructed a correlation matrix for the panel data to examine the multicollinearity as a necessary step before running the panel regression (Tab. 2). We find a negative relationship for some set of variables. However, the correlation values, in general, do not exceed ±0.5 on either side allowing us to proceed for further analysis.

We find a large variance for Liquidity Risk (LR2), which indicates that in the post-crisis period, the liquidity of sample companies varied significantly, and on further analysis, it is found that the best liquid companies for LR2 were IT companies. The infrastructure companies faced huge risk because of the aggressive investment behaviour of boards. The observed mean value for other corporate liquidity variables LR1 (Δ Cash & Equivalents) and LR3 (Δ NetCash) are –0.0005%, –0.454%, respectively implying cash-burning or exhaustion by corporate boards.

In our sample, the average number of directors (members) on the board is thirteen and the average proportion of non-executive directors on the board is 66.82% in 2010–2019. Additionally, 0.7% of the companies have been identified that do not have an audit committee and/or risk committee on the board. These features indicate that there is a dominance of promoters on the board which may probably imply that risk behaviour of these promoters may define the risk-taking propensity of the board.

Next, we run a panel regression to examine the relationship between board variables and risk variables ('Liquidity Risk 1', 'Liquidity Risk 2', 'Δ Financial Slack') and the Business Risk. Before running the panel regressions, we first evaluated the stationarity of the variables under the study. ADF test has been applied to examine the unit root. Lags have been taken appropriately. We use the following equations for final estimation.

$$\begin{aligned} \text{LR1} \;=\; & \alpha_{01} + \delta_{11}\,\text{BS} + \delta_{21}\,\Delta\text{BE} + \\ & + \delta_{31}\,\text{BI} + \delta_{41}\,\Delta^2\text{BEXP} + \\ & + \delta_{51}\,\text{BPC} + \delta_{61}\,\Delta\text{RD} + \\ & + \delta_{71}\,\Delta^2\,\text{RC} + \delta_{81}\,\log(\text{FS}) \end{aligned}$$

Tab. 2: Correlation Matrix

Variable	LR1	LR2	LR3	BR	BS	BE	BI	BEXP	BPC	RD	RC	FS
LR1	1	0.09***	0.11**	−0.24***	0.05*	0.00	−0.00	0.06*	0.03	−0.03	−0.05*	−0.01
LR2		1	−0.15***	0.05*	0.00	−0.00	−0.03	−0.01	−0.00	0.03	−0.01	−0.02
LR3			1	0.12***	0.16***	−0.01	0.06**	0.07**	0.03	−0.01	−0.01	−0.04
BR				1	0.02	−0.00	−0.04	−0.00	−0.02	0.04	0.02	0.01
BS					1	0.07**	0.50***	0.51***	−0.13***	−0.00	−0.03	0.22***
BE						1	0.17***	−0.04	−0.04	0.07**	0.06**	0.27***
BI							1	0.31***	−0.01	0.07**	0.00	0.04
BEXP								1	0.01	0.04	−0.08***	0.01
BPC									1	0.13***	−0.00	−0.12***
RD										1	−0.04	0.00
RC											1	0.19***
FS												1

Notes: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

$$
\begin{aligned}
\text{LR2} &= \alpha_{02} + \delta_{12}\,\text{BS} + \delta_{22}\,\Delta\text{BE} + \\
&\quad + \delta_{32}\,\text{BI} + \delta_{42}\,\Delta^2\text{BEXP} + \\
&\quad + \delta_{52}\,\text{BPC} + \delta_{62}\,\Delta\text{RD} + \\
&\quad + \delta_{72}\,\Delta^2\,\text{RC} + \delta_{82}\,\log(\text{FS})
\end{aligned}
$$

$$
\begin{aligned}
\text{LR3} &= \alpha_{03} + \delta_{13}\,\text{BS} + \delta_{23}\,\Delta\text{BE} + \\
&\quad + \delta_{33}\,\text{BI} + \delta_{43}\,\Delta^2\text{BEXP} + \\
&\quad + \delta_{53}\,\text{BPC} + \delta_{63}\,\Delta\text{RD} + \\
&\quad + \delta_{73}\,\Delta^2\,\text{RC} + \delta_{83}\,\log(\text{FS})
\end{aligned}
$$

$$
\begin{aligned}
\text{BR} &= \alpha_{04} + \delta_{14}\,\text{BS} + \delta_{24}\,\Delta\text{BE} + \\
&\quad + \delta_{34}\,\text{BI} + \delta_{44}\,\Delta^2\text{BEXP} + \\
&\quad + \delta_{54}\,\text{BPC} + \delta_{64}\,\Delta\text{RD} + \\
&\quad + \delta_{74}\,\Delta^2\,\text{RC} + \delta_{84}\,\log(\text{FS})
\end{aligned}
$$

Tab. 3: Panel Regression Results

Variable	Model I	Model II	Model III	Model IV
BS	−0.017	22.645	8.620***	0.023*
	(0.012)	(25.019)	(1.669)	(0.014)
BE	0.005	−2.108	−1.290	0.000
	(0.012)	(24.841)	(1.920)	(0.014)
BI	−0.010	14.637	−0.451	−0.019**
	(0.009)	(17.693)	(1.389)	(0.010)
BEXP	0.007	35.803***	0.884	0.003
	(0.007)	(13.910)	(1.058)	(0.007)
BPC	0.005	−1.257**	0.793	−0.004
	(0.004)	(0.512)	(0.650)	(0.005)
RD	−0.014	−34.459	−0.920	0.025*
	(0.014)	(27.502)	(2.164)	(0.015)
RC	−0.015**	−2.344	0.190	0.006
	(0.007)	(14.900)	(1.164)	(0.008)
FS	−0.001	2.390	−0.368*	0.000
	(0.001)	(2.476)	(0.193)	(0.001)
σ_u	0	8.022	0	0
σ_e	0.056	109.373	8.721	0.062
ρ	0	0.005	0	0

Notes: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

The results of the regression are shown in Tab. 3. We derive the following inferences from the results.

Board size (BS) and risk appetite. Board size is strongly associated with the inverse proxies of risk (LR3) i.e. financial slack and business risk (BR). It can be derived that the larger is the board (typically more than 13 members), the higher is the level of financial slack and business risk. These findings are contrary to a study on China where Haider and Fang (2016) established a negative relationship between board size and corporate risk.

Board efforts (BE) and risk-taking. Board efforts have no significant relationship with risk variables. The risk-taking capacity of the company is not affected by the presence of the audit committee, ESOP and the frequency of the meetings. These findings are opposite to the findings of McNulty et al. (2012) who establish a positive significant relationship between the board efforts and measures of liquidity and business risk.

Board independence (BI) and risk apatite. Board independence negatively influences busi-

Tab. 4: Summary of Results of CG Practices on Risk Proxies

Variables	Liquidity Risk (LR1)	Liquidity Risk (LR2)	Financial Slack (LR3)	Business Risk
BS (Board Size)	-	-	Positive	Positive
BE (Board Effort)	-	-	-	-
BI (Board Independence)	-	-	-	Negative
BEXP (Board Expertise)	-	Positive	-	-
BPC (Board Power Control)	-	Negative	-	-
RD (Remuneration Dynamics)	-	-	-	Positive
RC (Risk Concern)	Negative	-	-	-
FS (Firm Size)	-	-	Negative	-

Note: The table shows only significant relationships.

ness risk. Board independence has been found significant at 5% confidence level. This implies that the higher the number of independent directors, the business risk borne by the company will be lower. The presence of independent directors therefore reduces the propensity to take business risk. In a study on banks, Chu et al. (2019) have also established that the benefit of increasing the proportion of independent directors is reduced when we account for business risk.

Board expertise (BEXP) and risk-taking. Board expertise has been defined as the proportion of non-executive directors of the company and the professional attributes of board members. Board expertise is significantly positively related to risk taking (LR2). Harjoto et al. (2018) have established that board experiential diversity promotes better decision making and risk governance. We derive that expertise of the board has a significant contribution to the risk appetite of the company.

Board power control (BPC) and risk-taking. Board power control has been analysed on the basis of role duality of the chairman of the company as the managing director of the company as well. In our sample data, role duality is exhibited in 31.15% of the total cases. We find that BPC is significantly negatively related to short term (LR2) risk taking of the company. Kim and Buchanan (2011) have established that for US companies the CEO and board chairperson duality significantly reduces the risk propensity.

Remuneration dynamics (RD) and risk-borne. We find a positive relationship between the business risk and existence of the remuneration committee and frequency of the meetings at a confidence level of 10%. Bolton et al. (2015) establish that the excess risk-taking by the board can be addressed by basing remuneration and incentives. However, Swanepoel and Smit (2016) find that remuneration of the board in equity and cash from when increased, it led to lower risk taking. For Indian companies, we derive that remuneration committee ensures remuneration to board members and finally impacts the risk postures.

Risk concern (RC) and risk-bearing capacity. The results indicate that the dummy variable, risk concern and liquidity risk 1 (LR1) exhibit a significant negative relationship (at 5%). We derive that the existence of a risk committee affects the risk bearing capacity of the firm. Also, firm size has a negative significant relationship with financial slack (LR3) which implies that bigger firms take higher risks.

We summarise the results of the regression in Tab. 4.

5 DISCUSSION AND CONCLUSIONS

It can be inferred that board size, board expertise and remuneration dynamics are positively related to the risk, whereas board independence, board power control and risk concerns are negatively related to the risk appetite of the company. Also, board effort in terms of audit committee, frequency of meetings, ESOPs does not influence the risk potential of an organisation.

Yeh (2017) study on banks shows that the board governed by foreign shareholders may propel the boards to take more in pursuit of high returns. This implies that the board that has lesser diversification (internal/external or shareholders' groups) may take a high risk to fulfill; the corporate objectives that may lead to bankruptcies. Similarly, Kagaya and Jinnai (2016) show that firms in Japan that have more outside or non-executive directors promote risk-taking activities more aggressively. Our results are contrary to their findings since we observe that firms with more board independence take a lesser risk (the relationship is negative).

Finally, we aggregate the results of the relationships between the CG and risk variables. On the basis of an exploration of the results, we derive that some of the multinational Pharmaceutical and FMCG companies exhibit high risk-taking behaviour. The companies with a more consistent business model with good steady growth and are in existence for more than 25 years exhibit a moderate to low risk-taking behaviour. The independence of the board and power control in such companies is relatively low. Finally, we classify the companies into risk bundles (Tab. 5).

We derive the following inferences from Tab. 5.

a) The companies with negligible power control have a high appetite for risk implying higher credit risk that may not be supported by an equivalent and responsive business model.

b) Companies with low board expertise may take a lower level of financial and business risk that indicates the sub-optimality of operations. In other words, the propensity to take a structured risk significantly depends upon the level of board expertise. These companies may not remain competitive in long run and face the problem of sustainability.

c) In another bundle, we find that in spite of the fair representation of independent directors on the board, a lower level of board efforts reduces the propensity of companies to take the risk.

d) Companies lacking on the significant number of CG parameters are likely to be risky. This has direct implications for regulators, financiers and investors.

e) Companies with a good level of independence and expertise may take higher risks and can have good business prospects and valuation.

We find that for the five distinct bundles of companies, the corporate strategy may differ. CG practices can therefore predict the risk propensity and corporate practices may be modelled accordingly. Also, for companies with a poor level of CG practices, the regulators and policymakers can keep a check so that defaults and frauds can be minimised.

Interestingly, we find that even the best-performing companies can be far lacking in terms of CG practices. Cases of Companies like Satyam Computers, Punjab National Bank and the recent one of IIL&FS establish our notion. The conventional measures of CG based on scoring models may not be appropriate to evaluate the level of governance. Also, the over governance involving higher costs may not produce the best level of performance. Apart from the governance variables used in the study, there may a host of practices that are not captured in conventional evaluation procedures like regression-based scoring models which are not much of practical use now.

The results of the study also point out the bundles of CG practice that affect the risk propensity of firms imply a different strategy from a (a) corporate perspective and (b) a policy perspective.

Tab. 5: Bundled List of Companies based on Risk Behaviour

Bundle	Attributes	Risk Appetite (Financial Risk)	Risk Appetite (Business Risk)
Bundle 1	Negligible Power Control, Excellent Board Expertise	High	Moderate
Bundle 2	Good Power Control, Average Board Expertise	Low	Low
Bundle 3	Fair Board Independence, Average Board Efforts	Moderate	Low
Bundle 4	Low Board Expertise, Good Level of Independence, Varying Level of Board Efforts	Very High	Moderate
Bundle 5	High Independence, Good Expertise	High	Low

From a policy perspective, inferences can be drawn from the bundle of CG that can through light on the propensity of corporate fraud. The financial risk level emanating for a given CG bundle can help in credit default assessment. The propensity to do business can also be highlighted from the derived bundles. From a corporate perspective, the decision-makers can well define a set to follow on to achieve a defined state of performance. Accordingly, the policymakers and regulators can take appropriate steps that may include the promulgation of appropriate amendments in the legislation and establishment of the surveillance and monitoring mechanisms.

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7 ANNEX

Tab. 6: List of Selected Companies

Name	Industry	Name	Industry
A B B India Ltd.	Engineering	Hindustan Zinc Ltd.	Metals and Minerals
A C C Ltd.	Cement	I T C Ltd.	FMCG
Adani Ports Ltd.	Transport/Logistics	Idea Cellular Ltd.	Telecom
Ambuja Cements Ltd.	Cement	Indian Oil Corpn. Ltd.	Oil Processing
Apollo Hosp. Ent.Ltd.	Healthcare	Infosys Ltd.	IT
Ashok Leyland Ltd.	Automobiles	Interglobe Aviation Ltd.	Aviation
Asian Paints Ltd.	Industrial Chemicals	J S W Steel Ltd.	Steel
Aurobindo Pharma Ltd.	Pharma	Larsen & Toubro Ltd.	Diversified
Axis Bank Ltd.	Banking	Lupin Ltd.	Pharma
Bajaj Auto Ltd.	Automobiles	Mahindra & Mah. Ltd.	Automobiles
Bharat Electronics Ltd.	Electricals & Electronics	Marico Ltd.	Engineering
Bharat Forge Ltd.	Engineering	Maruti Suzuki India Ltd.	Automobiles
Bharat Petrol.Corp. Ltd.	Oil Processing	Motherson Sumi S Ltd.	Energy
Bharti Airtel Ltd.	Telecom	N H P C Ltd.	Energy
Bharti Infratel Ltd.	IT	N M D C Ltd.	Metals and Minerals
BHEL Ltd.	Engineering	N T P C Ltd.	Energy
Bosch Ltd.	Engineering	Oil India Ltd.	Oil Processing
Britannia Ind. Ltd.	FMCG	ONGC Ltd.	Oil Processing
Cadila Healthcare Ltd.	Pharma	P & G H H C Ltd.	FMCG
Castrol India Ltd.	Oil Processing	Pidilite Industries Ltd.	Industrial Chemicals
Cipla Ltd.	Pharma	Piramal Ent. Ltd.	Diversified
Coal India Ltd.	Energy	Power Grid C. of India	Energy
Colgate-Pal. (India) Ltd.	FMCG	Reliance Industries Ltd.	Diversified
Container Corp.of India	Transport/Logistics	Shree Cement Ltd.	Cement
Cummins India Ltd.	Engineering	Shriram Trans. F C Ltd.	Transport/Logistics
D L F Ltd.	Construction	Siemens Ltd.	Engineering
Dabur India Ltd.	Pharma	Steel Auth. of India Ltd.	Steel
Divi'S Laboratories Ltd.	Pharma	Sun Phar. Ltd.	Pharma
Dr. Reddy'S Lab. Ltd.	Pharma	Tata Motors Ltd.	Automobiles
Eicher Motors Ltd.	Automobiles	Tata Power Co. Ltd.	Energy
Emami Ltd.	FMCG	Tata Steel Ltd.	Steel
G A I L (India) Ltd.	Oil Processing	TCS Ltd.	IT
Glaxosmithkline Pha.td.	Pharma	Tech Mahindra Ltd.	Automobiles
GlaxosmithklineC H Ltd.	Pharma	Titan Company Ltd.	FMCG
Glenmark Pha. Ltd.	Pharma	Torrent Pharm. Ltd.	Pharma
Godrej Con.Pro. Ltd.	FMCG	U P L Ltd.	Industrial Chemicals
Grasim Industries Ltd.	Textiles	Ultratech Cement Ltd.	Cement
H C L Technologies Ltd.	IT	United Breweries Ltd.	FMCG
Havells India Ltd.	Electricals & Electronics	United Spirits Ltd.	FMCG
Hero Motocorp Ltd.	Automobiles	Vedanta Ltd.	Metals and Minerals
Hindalco Industries Ltd.	Metals and Minerals	Wipro Ltd.	IT
Hindustan Pet. Cor. Ltd.	Oil Processing	Zee Ent. Enter. Ltd.	Media
Hindustan Unilever Ltd.	FMCG		

Tab. 7: Industry-wise Descriptive Statistics

Variables	LR1		LR2		LR3		BR		BS		BE	
Industry	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Automobiles	−0.008	0.064	0.236	0.527	−0.064	0.366	−0.006	0.049	0.846	0.260	0.697	0.166
Aviation	−0.006	0.119	0.343	0.431	1.257	3.859	0.014	0.131	0.129	0.279	0.567	0.172
Cement	−0.001	0.039	0.382	1.185	−0.006	0.130	0.010	0.065	0.914	0.099	0.759	0.171
Construction	0.001	0.013	0.064	0.349	0.026	0.218	−0.009	0.169	0.957	0.069	0.963	0.080
Diversified	−0.003	0.040	0.021	1.021	−0.087	0.477	−0.016	0.111	0.974	0.061	0.778	0.154
Electricals/Electro	−0.008	0.103	0.003	1.178	−0.204	1.141	0.008	0.045	0.914	0.091	0.650	0.116
Energy	−0.008	0.033	0.096	1.774	−0.041	0.278	0.004	0.048	0.945	0.096	0.718	0.113
Engineering	0.001	0.041	0.114	0.322	0.078	0.434	0.002	0.041	0.841	0.176	0.689	0.135
FMCG	−0.007	0.076	−0.030	1.198	0.021	0.571	0.004	0.071	0.834	0.216	0.650	0.175
Healthcare	0.001	0.033	0.224	0.401	0.015	0.161	0.017	0.031	0.964	0.069	0.675	0.111
Industrial Chemicals	−0.002	0.057	0.222	1.398	−0.010	0.399	−0.006	0.041	0.950	0.082	0.635	0.174
IT	−0.010	0.067	−0.151	1.289	−0.016	0.360	−0.020	0.049	0.804	0.245	0.785	0.141
Media	0.012	0.069	−0.184	1.832	0.136	1.460	−0.027	0.066	0.671	0.118	0.721	0.155
Metals and Minerals	−0.018	0.087	−0.002	1.527	−0.347	1.549	0.011	0.056	0.836	0.144	0.729	0.142
Oil Processing	−0.009	0.051	0.194	0.539	−0.142	1.146	0.008	0.033	0.871	0.185	0.672	0.118
Pharma	0.001	0.049	0.300	0.857	−0.024	1.114	−0.001	0.046	0.792	0.133	0.714	0.173
Steel	−0.013	0.035	0.057	0.990	−0.037	0.161	0.011	0.054	0.962	0.079	0.712	0.182
Telecom	−0.003	0.033	0.297	0.550	0.000	0.084	0.005	0.089	0.950	0.081	0.877	0.108
Textiles	0.000	0.015	0.469	0.929	−0.085	0.212	−0.028	0.079	0.936	0.079	0.771	0.035
Transport/Logistics	−0.019	0.056	0.198	1.457	−0.941	3.292	−0.004	0.056	0.852	0.148	0.711	0.127

Variables	BI		BEXP		BPC		RD		RC		FS	
Industry	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Automobiles	0.894	0.155	0.836	0.275	0.875	0.333	0.922	0.152	0.800	0.403	9.928	1.215
Aviation	0.000	0.000	0.150	0.242	1.000	0.000	0.800	0.105	1.000	0.000	8.650	1.118
Cement	0.950	0.165	0.803	0.308	1.000	0.000	0.944	0.133	1.000	0.000	9.494	0.664
Construction	0.983	0.053	0.860	0.117	1.000	0.000	1.000	0.000	1.000	0.000	11.038	0.087
Diversified	0.933	0.173	0.840	0.305	0.600	0.498	1.000	0.000	1.000	0.000	11.520	1.487
Electricals/Electro	0.950	0.095	0.900	0.138	0.050	0.224	0.950	0.103	0.600	0.503	8.787	0.869
Energy	0.906	0.172	0.763	0.357	0.467	0.503	0.908	0.130	1.000	0.000	11.091	0.964
Engineering	0.814	0.274	0.827	0.228	0.486	0.503	0.961	0.092	0.771	0.423	8.975	0.982
FMCG	0.837	0.283	0.768	0.317	0.960	0.197	0.935	0.197	0.920	0.273	8.378	1.134
Healthcare	1.000	0.000	0.850	0.324	1.000	0.000	0.825	0.121	1.000	0.000	8.422	0.449
Industrial Chemicals	0.994	0.030	0.907	0.198	0.667	0.479	0.917	0.120	0.767	0.430	8.738	0.746
IT	0.967	0.075	0.702	0.395	0.800	0.404	0.935	0.111	1.000	0.000	10.532	0.567
Media	0.750	0.196	0.730	0.298	0.900	0.316	0.825	0.121	1.000	0.000	8.719	0.366
Metals and Minerals	0.867	0.174	0.703	0.342	0.750	0.439	0.894	0.137	1.000	0.000	10.777	0.974
Oil Processing	0.736	0.329	0.690	0.323	0.183	0.390	0.792	0.147	0.867	0.343	10.446	1.562
Pharma	0.899	0.137	0.706	0.266	0.667	0.473	0.950	0.100	0.933	0.250	8.860	0.844
Steel	0.967	0.092	0.873	0.263	0.733	0.450	0.950	0.102	1.000	0.000	11.467	0.475
Telecom	0.992	0.037	0.895	0.231	0.800	0.410	0.913	0.122	1.000	0.000	11.257	0.891
Textiles	0.983	0.053	0.850	0.201	1.000	0.000	0.875	0.132	1.000	0.000	10.797	0.608
Transport/Logistics	0.855	0.136	0.767	0.263	0.533	0.507	0.967	0.183	1.000	0.000	9.873	0.908

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AN EMPIRICAL ANALYSIS OF THE CURRENCY HEDGING BEHAVIOR OF NORTH GERMAN SMES

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ABSTRACT

In a globalized world, companies are able to sell their products or services abroad or purchase them abroad. This generates advantages due to the expansion of the business area creating a broader market but comes along with currency risks. This paper examines which factors influence German SMEs' willingness to conduct foreign business, respectively to do transactions in foreign currencies. An empirical study researches how the currency risk in North German SMEs is valued and assessed. The analysis further identifies the differences in the use of foreign currencies of rural and urban SMEs and examines the reasons for the use of foreign currencies and currency management which lead to the use of currency hedging. With a sample size of 73 SMEs the study aims for a better understanding of the foreign activities of German SMEs and investigates the approach to the currency risk management for a better understanding of their needs. In general, the paper shows that the larger a company is, the more likely is the use of a currency management. A comparison of rural and urban SMEs in Northern Germany reveals, that urban ones are larger and therefore more likely to use currency hedging. Based on the research, the paper provides recommendations for SMEs with foreign sales.

KEY WORDS

currency hedging, currency management, importers, exporters, currency volatility, North German SMEs

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1 INTRODUCTION

The financial market is characterized by turbulences and imperfections (Arnold et al., 2014). This is identified by Davies et al. (2006) to be the main reason for the importance of the usage of currency hedging and other forms of financial risk management. Thus, a majority of exporting firms is currently using hedging as part of their financial strategy (Čadek et al., 2011). Arnold et al. (2014) argue that in a perfect capital market hedging would not be of any benefit for the companies using it. As the capital market is not perfect, like in a theoretical thought experiment, but rather characterised by imperfections, different tax regulations, transaction costs, and potential risks, measures need to be taken by a company to deal with these risks in order to be successful.

Therefore, a risk management is essential and in accordance with ISO 31000 is defined as the identification, evaluation, and prioritisation of risks and the subsequently following minimising, monitoring, and controlling of the risks associated with possible negative events. These risks include immanent ones like the possible failure of a project or a newly launched product, the risk of uncertainty in financial markets, or the consequences of natural disasters, thus spanning a vast array of possible fields that need to be covered by successful risk management. This is especially true for multinational companies, as their possible risks have a higher variety. However, even small and medium enterprises (SMEs) are also exposed to currency risk.

The current study focuses on the situation of German SMEs. Following the notion of Falkner and Hiebl (2015) that one of the SMEs most pressing problems is the lack of resources that they can invest in the risk management of – in this case – currency management. One of the main assumptions of the study is that a positive correlation between company's size and the involvement in currency (risk) management activities exist. A research question and a number of hypotheses was deducted for the purpose of this paper.

RQ: What influences SMEs' willingness to conduct business in foreign currencies?

Hypothesis 1: The smaller a company (number of employees, revenue), the less likely they are to do business in foreign currencies.

Hypothesis 2: The smaller a company (number of employees, revenue), the less likely they are to use currency hedging.

Hypothesis 3: If an SME imports goods from non-euro countries or sells them there without a middleman, then it uses a currency management tool.

The main goal of the paper is to explore factors influencing companies' decisions in regard to the usage of foreign currencies in their operations. Various indicators of company size are therefore put into relations with various indicators of FX usage.

2 LITERATURE REVIEW

Within large (multinational) companies financial markets have to be analysed more thoroughly, as multiple markets are of high relevance to these companies (Soin and Collier, 2013). Political developments and diplomatic relationships have to be taken into stronger account as well. However, authors such as Yiannaki (2012) or Falkner and Hiebl (2015) point out the importance of risk management – especially financial risk management – for SMEs as well. They make up a majority of companies in most economies. Yiannaki (2012), for example, cites numbers ranging from 67% in Ireland to 95% in Greece. At the same time, they only account for a much smaller share of employees, which creates additional risks and complications for SMEs. Their small size often makes it impossible to dedicate enough

resources to risk management or risk assessment (Falkner and Hiebl, 2015). At the same time, risks can often prove to be more fatal to SMEs than to bigger companies, which is especially true for financial firms (Yiannaki, 2012). SMEs on average benefit less from economies of scale and also have less access to (financial) resources than multinational Enterprises (MNEs). Their comparatively low equity rate also makes them more vulnerable to different external risks (Falkner and Hiebl, 2015). The main danger in this case is – among others, such as a loss of customers or damaged liability – the risk of bankruptcy. Given this comparatively high risk, the typical lack of resources that can be dedicated to risk management seems even more dangerous.

Another development that seems connected with this is the growing globalisation that not only influences MNEs which operate internationally but also SMEs which – more and more – also conduct their business on an international level (Bishev and Boskov, 2016). "The world economic relationships between foreign investment flows and international trade." (Bishev and Boskov, 2016, p. 39227). Especially for SMEs this offers new chances, as they are less limited to their own geographical area than they would have been decades ago – start-ups and SMEs can comparatively easily operate on an international or even transcontinental basis. While this offers new chances and opportunities, it also creates new risks – dealing in foreign currency (FX) is widely acknowledged to be a major risk factor – not only but especially – for SMEs (Čadek et al., 2011; Davies et al., 2006; Geyer-Klingenberg et al., 2018). If companies have accounts payable or receivable in foreign currencies, they face foreign exchange transactions exposure as part of their ongoing business processes (McCarthy, 1999). Especially if the volatility of the trading partners rises, this proves to be a tangible risk for companies. A recent example of such volatility is the development in Russia concerning the sanctions posed against Russia and the countersanctions arising from this development.

Dreger et al. (2016) argue, for example, that the sanctions themselves did not affect the Russian economy strongly (at least from the 2016 point of view), but the price of oil did, as it has a powerful effect on the rouble. The authors focused their work mostly on exchange rate fluctuations, analysing the development of the rouble in comparison to the US dollar, showing the dramatic fall (by more than 50% in comparison to the US dollar) after the conflict between Russia and Ukraine escalated in 2014. The authors used high-frequency data on exchange rates and oil prices as well as the information about the exact timing of the implementation of the sanctions. Their analyses showed that the primary driver behind the fall of the rouble was not the sanctions that were imposed on Russia but the falling oil price at the time. The authors explain that for a country that is so dependent on the export of its natural resources, the price of these resources on the international market is the most crucial predictor for its economic development. One of intangible but nonetheless dramatic consequences of sanctions is a general decrease of trust towards Russia. Trust is an essential part of business, which cannot be replaced by any other forms of capital. Without trust, building relationships becomes problematic; it makes any future plans fragile, which in the end leads to the flight of the foreign capital (Portanskij, 2014). Thus, during the first year of sanctions, the amount of foreign capital withdrawn from the Russian economy was more than for the whole previous year 2013. The flight of capital provides additional pressure on the rouble and increases inflation, which in return worsens the investment climate even more, which is proved by the behaviour of the foreign banks in Russia.

Developments such as this can be hard to predict and show the importance of also having to analyse political risks when it comes to the management of financial risks. The example of Russia also shows the consequences for German companies – many of them were (or still are) deeply involved with Russian business and export their goods to the country. By the period preceding the introduction of the Western sanctions on Russian economy, Western MNEs were able to achieve obvious dominance in some segments of the Russian market. Thus, by 2012

the share of the Russian tobacco market and car assembly facilities controlled by the Western MNEs achieved 90%, the share of the foreign producers on the beer and juice markets was almost equal with 85% and 75%, while the beauty and cosmetic markets were dominated by foreign producers by 60% (Gurkov and Saidov, 2017). "For German companies, Russia is a huge market with vast energy wealth and more than 140 million customers" (Meister, 2014, p. 3). At the same time, the developments on the market as well as the drastic fall of the rouble also strongly influenced the performance of German SMEs and MNEs.

This seems especially true for German companies, as Germany is often labelled "Exportweltmeister", literally: export world champion (Sinn, 2006). The German economy depends heavily on its export – with goods such as cars (and all the aspects of their supply chain) being known in and exported to nearly the whole world (Moser et al., 2008).

As an export-oriented economy, the management of currency risks and associated political risks is crucial. On a political level, this can be observed looking at Germany's early focus on the creation of trade unions and the currency union, used for reducing frictions in international trade (Moser et al., 2008). Companies which are aware of financial risks and take according measures are, on average, more successful than others (Hang et al., 2017; Khediri and Folus, 2010). This implies the need for actions on both sides: On corporate level, by using an adequate currency strategy, and on political level, by providing a stable currency due to a well-managed monetary policy and an industry-friendly state on the basis of a good fiscal policy.

3 MATERIALS AND METHODS

For the purpose of this study, a total of $n = 73$ companies was assessed using an online survey. Participants for the study were acquired out of the professional network of the author, thus the sample consists of representatives of (northern) German SMEs from different fields. The majority of companies assessed in this study stems from the fields of production or retail. The participants themselves were for the biggest part either CEOs or CFOs of their respective company, as this was aimed for by the researcher.

The questionnaire used in this study put an emphasis on closed-ended questions, wherever possible based on a Likert scale (Boone and Boone, 2012). This allows not only for easier and more valid analysis but also makes the participation easier for participants. One of the core goals in the development of the questionnaire was its ease of use and thereby in keeping it as short as possible, while still asking all relevant questions. It was assumed that managers of SMEs (who were the target sample of the study) would not be willing to invest more than a few minutes in participating in a scientific study. Therefore, an accuracy-speed trade-off had to be accepted. While, partially, more in-depth questions would have been of interest, they would have meant a potentially drastically lower sample size. It was particularly important that the first question asked directly whether foreign affairs exist in non-euro countries, in order to then ask whether invoicing also takes place in foreign currency, to get a clear view of the survey group.

Data was collected using an online survey tool. Google Forms was chosen for this purpose due to its strength in the field of user experience: It is easy to handle for participants and requires neither special skills, nor special soft- or hardware. Google Forms is optimized for desktop and mobile applications – having no limitation in this regard. All necessary types of questions (mostly single-choice items) are supported by this online survey tool.

Each item was marked as compulsory. This gave participants no option to either willingly or accidently skip questions and, providing a complete data set without any missing data. While this was arranged by the software itself, during the course of the analysis the data was again checked for missing data – none were found.

The data gathered with the online survey tool Google Forms was exported as a CSV file and processed with Microsoft Excel. MS Excel was used to make first adjustments to the data like filtering out missing data or eliminating participants' who did not fully complete the questionnaire (which could not be identified within this dataset, however). The thereby cleaned data was then exported to analysing software IBM SPSS which was used to conduct statistical analyses. Describing the sample via descriptive statistics formed the first step of this analysis. Following the first approach, the analyses were based on a correlational approach. Only for the comparison of urban and rural companies a Levene test was performed for a validation of the variance homogeneity of all variances. Following the Levene test, t-tests were computed. It is checked whether the samples "urban" and "rural" differ statistically significantly from each other. The null hypothesis assumes that the difference between the two groups is so small that both come from the same population. The alternative hypothesis assumes that the mean values are so different that they have to be assigned to different populations.

Furthermore, the companies surveyed can be assigned to the areas of manufacturing, trade, consultation and other services.

4 RESULTS

The regional affiliation of the study group is limited to the federal states of Hamburg (around 71,000 SMEs in 2018) and Schleswig-Holstein (around 93,000 SMEs in 2018) and thus covers the northernmost part of Germany (Statistik-Nord, 2020). The participating companies are known to the author from his work at a regional bank in this area and represent a balanced selection of companies with and without foreign currency activity via the regional bank. The companies surveyed also had connections to other banks. Due to the even distribution of the annual sales of the surveyed SMEs and the geographical distribution of the company headquarters, the sample is considered as relevant for the region.

4.1 Descriptive Results – Describing the Sample and the Variables

Out of the $n = 73$ companies participating in the study, a total of 42 reported to have foreign affairs. 37 of the companies reported to (also) invoice in foreign currency. Most of the companies involved in this study described themselves as independent (51), whereas only 22 are organized as a branch of another corporation.

The average number of employees of companies participating in this study is 39 and the average annual turnover equals 4.3 million EUR. The distribution of this turnover among companies is depicted in Fig. 1.

The study group differs in $n_{\text{Urban}} = 43$ companies and $n_{\text{Rural}} = 30$ companies. While only 8 of the rural companies currently conduct actively foreign business, 34 urban companies use foreign business commonly. Nevertheless, there is a difference between active foreign business (buying and selling abroad) and invoicing in foreign currency through a middleman. In total 42 companies conduct an active foreign business commonly.

Of all the participating companies, a total of 46 claimed to be principally aware of currency risks for their own company. 48 participants furthermore agreed that currency management in general is important to their company. The remaining 25 companies stated that currency management is currently not important for them, either because it is not part of their business or as there is no time for this, as other matters are more pressing.

In order to further foster the understanding of the participating companies and their needs in terms of currency management, the share of foreign currency payments in relation to EUR payments was computed. For this purpose, EUR payments from or into foreign countries were compared to FX (USD, CHF, CYH, etc.)

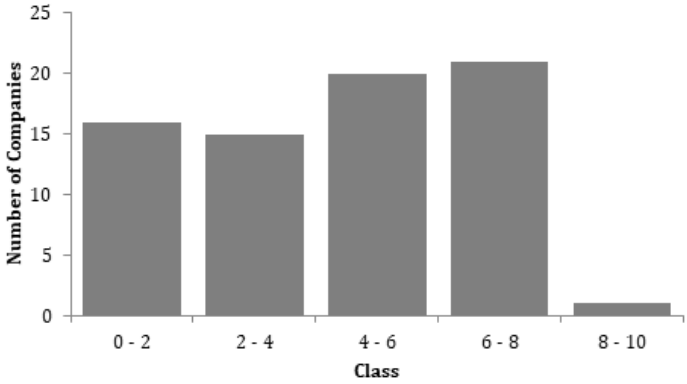

Fig. 1: Annual turnover (in million EUR) of companies in the sample

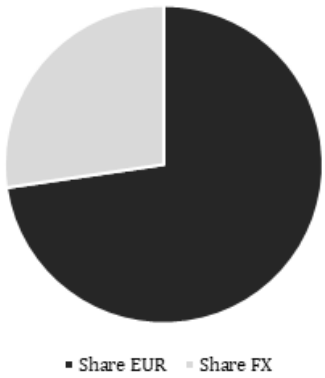

Fig. 2: Comparison of EUR and FX payments

payments from or into foreign countries were compared with each other in terms of their relative share.

4.2 Inference Statistical Approach – Answering the Hypotheses

Hypothesis 1

The first hypothesis posed within this paper was that the size of a company is correlated to the likeliness of conducting business in foreign currencies. The assumption was that the smaller a company is (as measured for the purpose of this study by the number of employees and by the annual turnover), the less likely a company should conduct business in a foreign currency.

In order to assess this hypothesis, a correlation analysis was conducted, connecting the size of a company to various indicators of conduction of business in foreign currencies. These indicators were the questions regarding whether the companies have foreign affairs at all, whether they invoice in foreign currencies, how willing they are to conduct business in foreign currency, whether they import/export without a middleman (indicating that they directly conduct transactions in foreign currencies), and the question about the share of non-EUR transactions. Tab. 1 displays the results of the analysis. In this case both the size of the company measured by the number of employees and by the annual turnover (in million EUR) was used here. While there is a strong correlation between the two indicators relating to the company size, it was still decided

to use both for the purpose of answering the hypotheses totally.

Tab. 1: Correlation Analysis for Hypothesis 1

Measure	Number of Employees	Annual Turnover (million EUR)
Foreign affairs	0.160	0.267*
Invoicing in FX	−0.146	−0.035
Share of EU transactions	−0.371**	−0.286*
Share of FX transactions	0.371**	0.286*
Willingness to conduct business in FX	−0.339*	−0.170
Import without middleman	0.272*	0.168
Export without middleman	0.272*	0.168
Export turnover	0.412**	0.614**
Import turnover	0.273*	0.554**

Note: $*p < 0.05$, $**p < 0.01$.

The results clearly indicate that the assumption made in hypothesis 1 can be confirmed: The bigger a company – in this case measured by the number of employees and by the annual turnover – the higher the likelihood of a company to conduct business not only in its own currency but also in foreign currencies. The clearest indicator for this relationship seems to be the actual share of business conducted in foreign currency – here a correlation of $r = 0.371$ (in regards to the number of employees) and $r = 0.286$ (in regards to the annual turnover) could be identified and shown to be of statistical significance ($p < 0.01$ and $p < 0.05$, respectively). Both the import and export turnover also proved to be strongly correlated to the company size, although here it can be argued that the turnover itself is strongly correlated to and influenced by these numbers, so that they are not viewed as the most important criteria for the use of foreign currencies.

Surprisingly, however, the willingness to conduct business in foreign currencies is only partially influenced by the company size. Instead, it is connected to the number of employees (the more employees the more willing companies seem to conduct business in foreign currencies) but not to the annual turnover. Also, no connection was found to the invoicing in foreign currencies – this was not connected to the company size.

The correlation table concludingly reveals that the number of employees seems to be the stronger predictor for a company's willingness to conduct business in foreign currencies than their annual turnover. Hypothesis 1 can be confirmed – the company size is directly related to the willingness to conduct business in foreign currencies – the bigger a company (especially but not exclusively as measured by the number of employees), the more likely and willing they are to conduct business in foreign currency.

Hypothesis 2

The second hypothesis concerned the companies' likelihood of using currency hedging depending on their size. Again, as for the first hypothesis, both indicators of the company's size were used to compute the correlation analysis needed to answer this hypothesis.

Tab. 2: Correlation Analysis for Hypothesis 2

Measure	Number of Employees	Annual Turnover (million EUR)
Awareness of currency risks	0.424**	0.438**
Currency management is important	0.390**	0.363*
Usage of currency hedging	0.272*	0.169
Relevance of currency management	−0.114	0.050
Evaluation of currency strategy	0.071	−0.198
Existence of a foreign currency account	0.272*	0.168
Currency trading	0.166	0.159

Note: $*p < 0.05$, $**p < 0.01$.

In order to assess the currency hedging usage of companies, a variety of indicators was again chosen to be analysed: general awareness of currency risks, perceived importance of currency management, usage of currency hedging, relevance of currency management for the company, evaluation of the company's currency management strategy, existence of a

foreign currency account, and the company's involvement in currency trading.

Again, the number of employees proved to be the stronger predictor than the annual turnover. In general, a positive relationship between company's size (measured by the number of employees and the annual turnover) and the awareness of currency risks was found (see Tab. 2). Furthermore, companies tended to agree more with the importance of currency management the larger they were ($r = 0.390$ for the number of employees and $r = 0.363$ for the annual turnover). This, however, was not true for the perceived relevance of currency management for the company itself: No statistically significant correlation between the company's size and the perceived relevance of currency management for the company could be identified. In a similar vein, no connection between the company's size and their own evaluation of their currency management could be shown – larger companies do not evaluate their own strategy better than smaller ones. For the general usage of currency hedging, a significant correlation with the number of employees could be found ($r = 0.272$, $p < 0.01$). However, no correlation between the usage of hedging and the annual turnover could be identified.

Concluding, that hypothesis 2 could be confirmed: The size of the company is connected to various indicators of currency hedging. The smaller a company is, the less likely and the less willingly they seem to use currency hedging as well as a currency management.

Hypothesis 3

The third hypothesis proposed a positive relationship between the import and the export of goods from non-euro countries and the use of currency management tools. In this case the import/export of goods without a middleman (which was shown to be correlated to the company size, as shown in the first hypothesis) was entered in a correlation analysis along with the usage of currency hedging. A positive correlation of $r = 0.530$ ($p < 0.01$) could be shown for this relationship – those companies who make use of currency hedging also are more inclined to conduct imports and exports without middleman. This confirms the third hypothesis as well.

Post hoc – additional analyses

Another assumption posed by this work, but not explicitly stated in form of a hypothesis, was that rural and urban companies in Northern Germany differ from each other in various aspects, such as size and openness towards conducting business in foreign currencies and the usage of currency hedging.

Tab. 3: Comparison of urban and rural companies

Measure	t	**df**	p
Number of employees[a]	−3.94	71	0.000**
Annual turnover (Mio. EUR)[b]	−3.82	46	0.000**
Awareness of currency risks[b]	−1.41	58	0.164
Share of FX transactions[a]	−1.70	71	0.093
Willingness to conduct business FX[a]	2.17	71	0.033*
Use of currency hedging[b]	−1.64	65	0.106
Relevance of currency management[a]	−0.97	71	0.334

Notes: [a]equal variances assumed; [b]equal variances not assumed; *$p < 0.05$, **$p < 0.01$.

Tab. 4: Means and standard deviations

	Urban		**Rural**	
Measure	**M**	**SD**	**M**	**SD**
Number of employees	48.60	23.74	26.00	24.71
Annual turnover (million EUR)	5.23	1.69	3.18	2.57
Awareness of currency Risks	0.70	0.46	0.53	0.51
Share of FX transactions	31.86	21.75	23.27	20.44
Willingness to conduct business FX	2.63	1.43	3.33	1.27
Use of currency hedging	0.49	0.51	0.30	0.47
Relevance of currency management	3.16	1.31	2.83	1.58

Notes: $n_{\text{Urban}} = 43$, $n_{\text{Rural}} = 30$.

In order to assess this initial assumption, a t-test for independent samples was conducted. 30 out of the 73 companies participating in the study stated, that their headquarters is situated in a rural area of the German state

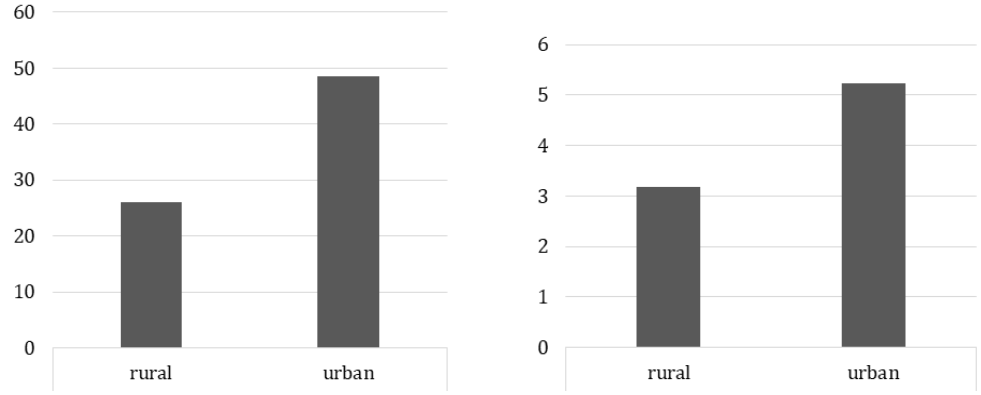

Fig. 3: Size comparison urban vs. rural companies – number of employees (a), annual turnover in million EUR (b)

Schleswig-Holstein. The remaining 43 companies described themselves as situated in urban areas. The *t*-test revealed significant differences between rural and urban companies. However, before conducting the *t*-test, a Levene test for variance homogeneity was conducted for all comparisons. In those cases, where the Levene test showed significant differences in regard to the homogeneity of variances, the *t*-values were corrected accordingly to achieve valid results. The results of the *t*-tests are displayed in Tab. 3.

Equal variances were not assumed for the annual turnover, the awareness of currency risks and the usage of currency hedging. In this case the values had to be adjusted accordingly. The null hypothesis, that the difference between the two groups is so small that both come from the same population, is rejected based on the results. The alternative hypothesis is accepted, as significant differences between urban and rural companies could especially be observed in relation to the company size. Urban companies tend to be significantly larger in terms of the number of employees as well as in terms of the annual turnover. This relation is graphically illustrated in Fig. 3.

5 DISCUSSION

The present study proposed three initial hypotheses that, considered together, helps to foster a better understanding of North German SMEs and their approach to currency management, respectively currency hedging.

The first hypothesis assumed a positive relationship between the company size and the likelihood of conducting business in foreign currencies. Larger companies, following the assumption, would be more willing and are more likely to conduct such a business. The results clearly indicate that this is indeed the case, as a significant positive correlation between different indicators of the company size and the willingness to conduct business in foreign currencies was found: The hypothesis reveals that the number of employees seems to be the stronger predictor for a company's willingness to conduct business in foreign currencies than their annual turnover. This mean, that the larger a company is, the more likely it conducts business in foreign currency. As proven by Falkner and Hiebl (2015) smaller sized companies are not able to dedicate enough resources to risk management or assessment. In other words, it can be assumed that smaller companies lack the resources to manage risks and to manage foreign currency transactions.

As companies grow – especially in terms of the number of employees (which of course is also related to their revenue and profit) – their capabilities for dealing with such challenges also grow, typically. On the one hand, as Yiannaki (2012) stated, SMEs benefit less from

economies of scale compared to MNEs. On the other hand, along with the growth of a company and subsequently the rise in the number of employees typically goes a higher chance of assigning specialized roles (Rauch and Frese, 2007). This allows them to employ specialized experts who are able to deal with the challenges of foreign currency transactions and currency hedging. Thus, based on the empirical findings and the findings in regard to the team composition (Bantel and Jackson, 1989; Rauch and Frese, 2007; Sanders and Carpenter, 1998) it can be concluded that larger teams with team roles that are more distinctive should allow for easier handling of foreign currency operations.

In a similar vein, the second hypothesis assumed that larger companies do not only more likely deal with foreign currencies but that they are also more likely to use currency hedging as a form of a financial risk management – again, as they have more resources to invest in such a complex action, as proven by Yiannaki (2012). The results showed that larger companies indeed are more aware of the risks associated with foreign currency transaction and that they are (tendentially) also more likely use according risk management strategies. The descriptive analysis showed that around 30% of the sales of the companies surveyed are carried out in foreign currency. This explains why the foreign currency accounts for a significant share of the sales of SMEs and implies that currency management is also necessary in SMEs. The personal evaluation of the currency strategy, however, seemed to be not influenced by the company size – the assessment of the strategy was not dependent on the size. This might be partially explained by the fact, that on the one hand the evaluation is a personal judgement in this study and on the other hand that larger companies are also more aware of currency risks, as shown by Čadek et al. (2011). Thereby, MNEs might also be more likely to see and reflect their own strategy in a critical way, due to their size and diversification in terms of employee structure. This structure of German MNEs allows them to better asses their Russian business relationships, in example the exchange rate to the rouble, since they observe the capital mobility based on the trust into the Russian economy (as described in the literature review).

Furthermore, in accordance with the third hypothesis, it was shown that those companies which depend heavier on trade (both import and export) with other countries also make more use of currency hedging. This is in line with the description from the literature review that Germany as "Exportweltmeister" is drastically dependent on exchange rate developments. The performance of German SMEs and MNEs is significantly influenced by exchange rate fluctuations.

Furthermore, as the introduction argued without posing a hypothesis for it, it was assessed in the course of this study, whether rural and urban companies in Northern Germany differ in the way of conducting foreign currency business. Such a difference between the two types of companies could indeed be shown. Companies from urban areas were in general larger and more willing to conduct business in foreign currencies. Paqué (2009) was able to demonstrate that industries with an affinity for exports and imports tend to be located in urban areas in order to ensure more efficient trade, which provides evidence for the tested results in this study. A tendency could also be shown towards a difference in the amount of FX transactions conducted by these companies.

This study was concludingly able to show a variety of (highly) significant correlations between various aspects of company's success and the use of currency management, respectively hedging. A variety of differences in these factors between more rural and more urban companies could also be shown. However, it has to be noted that these findings do not imply causation – while (partially based on reasoning chains of capital mobility and the resulting exchange rate fluctuations) it might seem possible to assume causal effects (e.g., that a more urban headquarters leads to higher success rates or that a higher annual turnover leads to a stronger need for currency management), this is not substantiated by the existing data. Rather, this study needs to be seen as a cross-section image of the SME landscape in Northern Germany. In order to further foster the understanding of the relation-

ship between currency management/hedging and financial success of companies and in order to also being able to make causal statements, a longitudinal design as the foundation for future research is proposed. While the results of this study are descriptive in nature, future research should take a more understanding-based approach. Such an approach would also allow to foster the understanding of why urban companies are more willing and more likely to conduct business in foreign currencies. As the results stand here, no such explanation can be found – hints towards a more urban, globalized mind-set seem just as valid as the idea that an urban environment allows for more global networking opportunities. In a similar vein, rural areas tend to be stronger shaped by agriculture than urban areas (Karásek et al., 2014; Straka and Tuzová, 2016). As such they are typically shaped by mostly local trade with a minor focus on international collaborations or trade, thus, minimizing the need for operations with foreign currencies.

Concluding, however, most initial assumptions could be confirmed based on the empirical study conducted in Schleswig-Holstein, Germany. A total of 73 companies with a wide diversity in regards of their branch, their age, and their location participated in the study. The author argues that thereby the participating companies can be considered to be representative for SMEs in the region of Schleswig-Holstein, Germany.

Another limitation lays in the comparability of the participants themselves. While the companies seem to be representative for SMEs in the area of Schleswig-Holstein, Germany, it is unclear whether it was always the right person completing the survey. While most questions aimed at gathering facts about the companies (which, the author argues, should be accessible to all participants and therefore can be considered to be valid), some of the questions used within the study included personal assessments and opinions. For example, the assessment of the company's currency management strategy (that proved to be neither correlated to company size ($r = 0.071$ for the number of employees, $r = -0.198$ for the annual turnover), nor to their general usage of currency hedging ($r = -0.158$), represents only the opinion of the participant himself and is not necessarily a real quality assessment. However, these results were validated by the author on the basis of the company's balance sheets in which the position "foreign currency losses" was always closely examined. None of the surveyed companies had given false information. It can therefore be assumed that the respondents' classification is correct.

6 CONCLUSION

The leading research question of this paper was concerned with factors influencing SMEs' willingness to conduct business in foreign currencies. In order to answer this question a set of hypotheses was developed that aimed at exploring various sets of predictors, including the company size (measured both by the number of employees and by the annual revenue), the usage of currency management tools and the location of the companies. The empirical survey revealed that the company size (especially when measured by the number of employees) positively influences the willingness to conduct business in foreign currencies. Also, the larger a company is, the more likely it is to use currency hedging. On the basis of the Russian example and the results of this survey, a clear recommendation must therefore be made: SMEs generally underestimate the currency risks and, due to the number of employees, have no or less capacity for adequate currency management. For SMEs dealing with foreign currency, the recommendation should therefore be made that an employee should be given responsibility for this in order to manage future volatility fluctuations.

Furthermore, it could be shown that companies in urban areas are in general larger and also, therefore, more likely to conduct business in foreign currencies.

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SHAREHOLDER STRUCTURE AND DIVIDEND POLICY IN THE DEVELOPED MARKETS OF ASIA-PACIFIC

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ABSTRACT

The objective of this study is to examine the relationship between the shareholder structure and dividend policy of an entire region – the developed markets in the Asia-Pacific region. The results show that at least three shareholder groups influence the dividend policy of companies. The group of investment advisors favours higher dividend payments. However, the greatest likelihood to receive extraordinary dividend payments is with shares of companies with a high stake of government investors. Further, the group of minority shareholders show a negative influence, which might be affected by the low interest-rate period and hence the lack of alternative investment opportunities for members of this group.

KEY WORDS

Asia-Pacific, dividend policy, developed markets, shareholder structure, ownership, dividend payments

JEL CODES

F230, F210

1 INTRODUCTION

The sharing of companies' annual net profits with their shareholders – this process is inseparable from a long history of capital markets and stock corporations. At the beginning, a company's shareholders were simultaneously the employees as well as owners of that enterprise. However, the control of business – more specifically, the company management and the ownership – has become separated over time. The split has led eventually to the practice of a company's annual net profit being shared with its shareholders, who are the owners of the company, through dividend payments to provide compensations for the capital that they made available for the company and the associated risks. Over the years, the sharing

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of the company's net profit has developed into its dividend policy. In a narrow sense, the term "dividend policy" could understood by the dividend payment behaviour of stock corporations (Guserl and Pernsteiner, 2015). This behaviour includes three crucial decisions: first, whether net profits will be shared, second, which proportion of the annual net profit will be distributed; and third, which form of dividend will be used. These three decisions are made by the company management and approved by the shareholders at the annual shareholders' meeting, where the dividend is officially announced.

Due to the fact that the dividend policy is usually controlled only by the management board – which is, however, influenced by shareholders with the most significant stake of the company – it has become a common issue for all market participants (Dutta and Saadi, 2011). The issue exists between company management and shareholders, as well as between the various groups of shareholders. The reason for the problem field of dividend policy lies in the essential differences in the interests of all involved and affected parties, especially between the numerous groups of shareholders (Baker, 2011).

On the one hand, there are common individual shareholders with a low number of holding shares and limited access to sources of information. They have different preferences than investors with high company stakes. Individual shareholders commonly pursue their preferences from a short-term view, which means they usually aim for the highest returns on their invested capital in the shortest possible period.

On the other hand, there are majority investor groups such as institutional investors, family owners, private equity investors, founders and even more, which also show diverse interests when it comes to dividend policy (Clark and Monk, 2017). For instance, the investment decisions of pension and insurance companies, determined as institutional investors, are related to long-term goals. In contrast, the decisions of hedge fund managers are oriented towards rather short-term goals. Besides, family owners, which are determined as controlling shareholders, usually have extensive and faster access to company information than all other groups of shareholders as they are commonly directly involved in the company management and hence in the company decisions. Therefore, their preferences in terms of dividend policy might differ essentially among majority investors (Talmor and Vasvari, 2011).

Accordingly, in terms of the dividend policy, there are not only differences in the interests between the groups of minority shareholders and majority shareholders, but also among majority shareholders and even among investors of institutional associations. Consequently, the question arises, which groups of shareholders are able to influence the dividend policy of companies.

Against the background of this question, several studies have dealt with the issue of dividend policy. However, most of recent studies focused their examinations on one market development level and on one single market – i.e. single country. Concerning the globalisation, the present study also examines one market development level as well as the previous studies, however, its objective is to widen the scope of the investigation to an entire region. The results could contribute more extensive information and hence greater transparency, especially for minority shareholders, who usually have only access to public information. Therefore, the objective of the present study is to investigates which groups of shareholders influence dividend policy of companies in the most important indices of developed markets in Asia-Pacific that includes Japan, Hong Kong, Singapore, New Zealand and Australia.

2 THEORETICAL BACKGROUND AND RELATED LITERATURE

From the ordinary shareholder's point of view – they are owners of the firm – the earned annual net profit should be distributed because the dividend payout is their compensation for the capital they made available for the company, including an extra charge for the entailed risks (Guserl and Pernsteiner, 2015). However, the dividend disbursements are not only related to the shareholder's yields, but they also affect the company's future efficiency and the interests of all stakeholders. In the event of the corporation's decision to reinvest its annual net profit instead of pouring it out as dividend, both shareholders and stakeholders would be affected positively. It means the company would not be withdrawn from its capital, so that its enterprise value does not decrease. Consequently, the shareholder's share value would remain steady or rather increase due to the positive outlook of the impacts in terms of the investment. In addition, the corporation's creditworthiness would be positively driven by the reinvestment as well, which would, in turn, lead to favourable impacts on both shareholder and stakeholder.

In case the company management decides to raise the dividend distribution in order to grow the shareholder's wealth, although the annual net profit had decreased in the previous periods, it is necessary to go into the capital market and acquire funds for the dividend payment or reduce the investment. However, the decision to reduce necessary investments entails risks for the company's future efficiency. Consequently, it is reasonable that the management should consider the disbursement holistically – it includes the consideration of investment, financing, and the interests of shareholders as all these are connected with each other (Baker, 2011).

Moreover, it is apparent that the differences in interests, especially between the various groups of shareholders, show the relevance of the issue of dividend policy. From the management point of view, it could be judicious to attempt to bring a balance between all shareholders with the dividend policy, especially between the numerous shareholder groups and their various preferences. Shareholders might prefer high dividends, low dividends, or even zero dividends, since all these might be connected with their investment strategy. For instance, shareholders who aim for passive investment commonly favour stable and continuous dividend distributions, independent of the variances in the corporation's net income (Ellermann, 2003). However, in contrast to passive shareholders, investors of young and emerging companies are more concerned to reach high growth rates, as their strategy lies rather in the reinvestment of the entire net profit to increase the revenue growth as much as possible. The growth leads consequently to an increase in the enterprise value and hence in the share value.

However, such a specific form of dividend policy as the total reinvestment may not maximise the worth of all shareholders. For example, dividend distributions take place on a current basis, whereas any reinvestment and hence the company growth is a future approach. Therefore, shareholders in corporations with a payout-friendly dividend policy remove their insecurity promptly, while the uncertainty remains for investors in growth companies (Van Horne and Wachowicz, 2008).

Regarding these diverse interests, there exist incentives on the part of the groups of majority shareholders to attempt to exercise control towards the company management. Accordingly, the management is in the position to act in the best interests of one or more influencing investor groups through a specified dividend policy and to the disadvantage of minority shareholders. Therefore, it is important to deal with the issue dividend policy to provide more extensive information and hence greater transparency which groups of investors are eventually influence the dividend decisions of companies.

In this context, numerous studies have dealt with the problem field dividend policy. Therefore, there is a vast body of research literature that gives an appropriate overview of this issue. However, the largest proportion of these studies have focused just on monetary potential influencing factors like a company's cash-flow, debts, equity capital, annual net profit, fixed assets, and market capitalisation. As opposed to the variety of studies related to the monetary influencing factors, only a limited number of previous studies have considered the shareholder structure or rather ownership structure as a potential influencing factor on dividend policy. The results of the recent studies with similar methodological approach are provided in the following:

Thanatawee dealt with the relationship between shareholder structure and dividend policy on the market of Thailand (Thanatawee, 2012) and China (Thanatawee, 2014). In the results related to his study in Thailand, it seems that corporations were paying higher dividends when their shares are hold by a large proportion of institutional investors. In contrast, individual shareholders are accounted for a negative relationship, which means they favour lower dividend payments. In his second study, conducted in China in 2014, the findings show evidence that the dividend policy is positively driven by the largest shareholders and government agencies, whereas the institutional investors and the foreign investors are accounted for lower dividend payments (Thanatawee, 2014). Besides, the results of China are in contrary to the findings of his study of Thailand, which means there is not a uniform picture.

Furthermore, Kumar (2003) investigated the relationship between dividend policy and corporate governance and the ownership structure on the markets of India. He identified a negative relationship between the dividend payments and the institutional investors and a positive relationship in the event of the companies are held by holding corporations. Setiawan and Kee Phua (2013) investigated 248 companies in the Indonesian Stock Exchange over a period of two years. They examined the relationship between dividend payments and corporate governance. Their findings show that the lower the level of corporate governance, the higher the amount of dividend payments. Besides, there is also evidence that poor corporate governance has adverse effects on the group of minority shareholders.

Mehrani et al. (2011), examined the influence of the shareholders groups on the dividend policy of companies listed on the Tehran Stock Exchange of Iran. The findings demonstrate a positive influence on dividend payments if the stake of shareholders is highly concentrated. In contrast, the relationship is negatively influenced by the institutional investors. However, in case the stake of institutional investors is highly concentrated, the dividend policy is positively influenced.

Warrad et al. (2012) investigated the shareholder groups and they influence on the dividend payments of companies in Jordan. The results constitute that foreign investors have advantageous effects on the dividend policy. Further, the results also reveal that there is no relationship between private investors, the government and the dividend policy.

The last similar study was conducted by Ullah et al. (2012) in Pakistan that also dealt with the shareholder structure and dividend payments. The results show a negative influence of the managerial ownership on the companies' dividend policies, whereas institutional investors and foreign investors affected the dividend payments positively.

In summary, the findings of the explained previous studies are not showing a consistent picture of the relationship between the shareholders and the companies' dividend policy. A good example of the contradiction constitutes the studies of Thailand and China from Thanatawee (2012, 2014). The results exhibit a different picture, although both studies are conducted in the same region and in similar markets.

3 METHODOLOGY AND DATA

The present study examines the relationship between the shareholder structure and dividend policy of companies, listed in the most important indices of developed market in the Asia-Pacific region for the year 2018. The developed markets of the Asia-Pacific region are represented by five countries, such as Japan, Hongkong, Singapore, New Zealand, as well as Australia. The chosen selection is connected to the 'MSCI Pacific Index' of the established MSCI Inc., formerly Morgan Stanley Capital International Inc. (short MSCI). MSCI Inc. is well-known as the global leading benchmark provider of equity market indices (Carrel, 2008). MSCI indices are tracking more than 90 per cent of the international equity assets.

The initial sample size consisted of 555 corporations, which were listed on the most important indices of the five developed countries – the Nikkei 225 Index of Japan (Nikkei), the Hang Seng Index of Hong Kong (HSI), the Straits Time Index of Singapore (STI), the New Zealand Stock Exchange of New Zealand (NZE), and the Australian Securities Exchange of Australia (ASX200) – as of 31 December 2018. To compile an appropriate sample, it was necessary to exclude 68 companies that belong to the financial and banking industry due to different accounting rules. The retention of these companies would affect the monetary dependent variable. In addition, only companies that distributed dividends to their shareholders were considered for the study so that 38 further companies were removed from the sample. Eventually, 449 companies remain in the sample for the investigation of developed markets in the Asia-Pacific region for the financial year 2018. Regarding the distribution of the 449 companies. Companies of Japan are account for 44 per cent and companies of Australia for 34 per cent of the sample. This high stake is related to the size and hence to the economic importance of these two countries – it means that they have the largest stock exchange indices. Therefore, these two countries are accounted for 78 per cent of the sample, followed by New Zealand with almost 10 per cent, and Singapore and Hong Kong with 6 per cent each to complete the sample.

3.1 Dividend Policy

The dependent variable for this study is represented by dividend payments. However, there are several measures to represent the dividend policy. The most commonly used measures are the dividend payout ratio, the dividend yield, and the dividend amount per share. All measures have been used as a dependent variable in numerous studies, and there is no evidence of a single preferred measure. However, since it appears appropriate to exclude all additional influencing factors, and the measure dividend yield is influenced by share prices and the dividend payout ratio by net incomes, this study uses the total dividend amount per share as dependent variable. The data were extracted from the companies' annual financial statements of this year 2018.

3.2 Independent Variables

In order to explain the companies' dividend policy, it is to determine which groups of shareholders influence the dividend amount and whether is their influence driven negatively or positively. For this purpose, eleven main independent variables and two monetary control variables have been chosen. Tab. 1 provides an overview of the determinants.

The first independent variable is represented by the percentage of shares held by investment advisors, also known as mutual funds or financial advisors (INVAD). Investment advisors are professionals and belong to the group of majority shareholders. Usually, they have discretionary authority over the assets of their customers and manage directly their assets that include securities analysis, investment recommendations, and direct management (Hung et al., 2008).

The percentage of shares held by banks constitutes the second independent variable (BANK). Banks, on the one hand, represent

Tab. 1: Determinants of the Dividend Policy

Abbreviation	Independent variables	Definition
INVAD	investment advisors	Share proportion of the group in a company
BANK	banks	Share proportion of the group in a company
PEINS	pension funds & insurance companies	Share proportion of the group in a company
GOV	government investors	Share proportion of the group in a company
HEDG	hedge fund managers	Share proportion of the group in a company
CORP	holding corporations	Share proportion of the group in a company
INDV	individual investors	Share proportion of the group in a company
TOP1	largest shareholder group	Share proportion of the largest group in a company
TOP3	shareholder concentration	Share proportion the three largest groups in a company
INST	insititutional investors	Total number of investors
CONSH	controlling shareholders	Total number of controlling shareholders
MCAP	market capitalisation	Market value of all outstanding shares of a company
CFPS	free cash flow per share	Free cash flow divided by all outstanding shares of a company

the voting proxy of their clients; they are, on the other hand, pursue their own interests as lenders. Correspondingly, it is interesting to find out whether banks influence the dividend policy and in which direction. A negative influence might be in favour of their interests as lenders, while a positive influence might be in favour of their clients who are often small investors and hence belong to the groups of minority shareholders that usually prefer high dividend payments (Baker, 2011).

Pension funds and insurance companies (PEINS) are the third variable and measured by the percentage of holding shares as well. Pension funds are entities or funds that are dedicated to providing retirement income; they are established by companies. The goal of these funds is to generate stable and long-term growth in the yield to ensure pensions for their employees when they retire. It should be mentioned that pensions funds are one of the largest institutional investors and hence combine one of the biggest pools of investment capital in the world (Monks and Minow, 2011). In addition to pension funds, insurance companies are part of the independent variable as well. This allocation is related to the background that insurance companies are commonly represented by life insurers and assigned to long-term investors who do not pursue significant management influence (Monks and Minow, 2011).

The fourth independent variable, which is also measured by the percentage of holding shares, is represented by government investors (GOV). To government investors belong individuals, institutions, or agencies that have control over a country, state, or nation. Government relatives often hold a significant stake of companies of system-relevant fields, such as the energy, food, and healthcare sectors, especially in emerging markets (OECD, 2015).

The next variable is related to hedge fund managers (HEDG) and is also measured by the percentage of holding shares. Hedge fund managers, who can be single managers or entities, differ essentially from investment advisors. Usually, they require a significant initial minimum on investment and hence are only available for a limited number of investors (Shain, 2008). In addition, they are more flexible in their investment strategies compared to investment advisors. Hedge fund managers do not need a high daily liquidity to ensure that predominantly small investors can join and leave the investment fund on a day-to-day basis. As their clients invest high amounts of capital, they can set up a private partnership with an individual strategy aligned to the risk preferences of their respective clients.

Holding companies (CORP) build the sixth independent variable, which is also measured by the percentage of holding shares. Holding companies are defined as parent companies that control several other companies. They do not produce any goods or services since their focus lies only on managing their subsidiaries and investments.

The seventh variable is represented by individual shareholders (INDV) and measured by the percentage of holding shares. The group of individual shareholders combines all groups of small investors and therefore represents the group of minority shareholders. As previously explained, this shareholder group differs significantly from the other groups of investors as their investments, preferences, and influences are not comparable – even not within the group itself. In addition, the previous studies of Thanatawee (2012 and 2014), which were conducted in two countries in Asia-Pacific confirmed the contrary picture of the group's influence.

To examine whether the group with the most significant number of shares among the described shareholder groups is accountable for higher or lower dividend payments, the eighth independent variable is used to represent the largest shareholder group (TOP1). The largest shareholder group is measured by the highest stake of company shares of the first seven variables.

The last independent variable measured by the share proportion in a company is represented by the shareholder concentration (TOP3). Regarding the studies on Thailand and China (Thanatawee 2012 and 2014) and another study on Japan (Harada and Nguyen, 2011), the shareholder concentration was measured by the percentage of company shares held by the five largest shareholders. In terms of the present study in which the shareholders were divided into seven groups, the consideration of the five most significant groups of shareholders seems quite broad. Therefore, the shareholder concentration is measured by the highest proportion of company shares by the three largest shareholder groups.

The following independent variable is related to institutional investors (INST) and is measured, in contrast to the previous variables, by the total number of institutional shareholders. As opposed to the first six variables in which the institutional investors were divided into specific groups, this variable shows institutional investors independent of their respective group. This variable will be used to make a statement whether institutional investors at all influence the dividend policy and in which direction.

Controlling shareholders, also known as insiders (CONSH), represent the last primary independent variable, which is likewise measured by the total number of controlling investors. Among the group of controlling shareholders are family owners, private equity investors, founders, and executives with a threshold of holding shares above 5 per cent. Members of this shareholder group usually are directly involved in the company management and hence these shareholders have the capability to exercise immediate influence on dividend policy (Erismann-Peyer et al., 2008). The outcomes of the following regression analysis will demonstrate whether the anticipated influence of controlling shareholders on the management board affects the dividend distributions by companies. In addition to the 11 main independent variables, two essential control variables – market capitalisation and free cash flow per share – are used in the regression analysis.

The first control variable, market capitalisation (MCAP), shows the company value on stock exchange markets and is determined by multiplying the share price with the number of outstanding shares. The market capitalisation is also an indicator of the company size and its maturity. Companies with higher market capitalisation are more mature and more liquid due to lower growth potential and hence lower investments (Rashid and Islam, 2008). Against this background, the likelihood of higher dividends with higher market capitalisation is expected.

The second variable free cash flow per share (CFPS) is measured by dividing the total free cash flow by the outstanding shares and indicates the liquidity per share the company earned in the respective period (Stickney et al., 2010). Accordingly, free cash flow per share is the actual return of investment that the shareholders made available to the company. As free cash flow is calculated by operational cash flow minus capital expenditures – i.e. plus the cash flow from investing activities which is commonly a negative amount – the total sum is

the remaining cash amount that belongs to the company owner (Mulford and Comiskey, 2005).

Descriptive Statistics

In order to provide an overview of the distribution of dividend amount per share, shareholder structure and two control variables of the sample, the descriptive statistics were carried out. The Tab. 4 with all results is provided in the Annex.

Regarding the dependent variable dividend per share (DPS), the result of the mean shows that the dividend per share, paid by the companies and reported in their annual financial statement of the year 2018, amounts to 0.41 cent USD. The highest dividend amount per share was paid by the commercial real estate company Unibail-Rodamco-Westfield SE, which is known as the largest real estate company in Europe. The company took over the Australian Westfield Corporation in December 2017 so that the company is consequently listed in the Australian Index ASX200.

Regarding the shareholder structure, the group of investment advisors (INVAD) holds, on average, almost 52 per cent of the company shares, thereby holding the highest company stake in the entire sample. The result reflects the significance of this shareholder group, its investment funds, and hence its possibility to exercise substantial influence towards the company management. It is also apparent that other institutional investor groups, such as banks (BANKS), pension and insurance companies (PEINS), governments (GOV), and hedge fund managers (HEDG), hold, on average, a stake below the 10 per cent level. Only the group of holding companies (CORP) accounts for a 15.78 per cent ownership fraction.

The independent variable individual investors (INDV), represented by the group of minority shareholders, shows that this group owns, on average, 10.15 per cent of dividend-paying companies. In this context, the group accounts for more than 50 per cent ownership of 32 companies, while its ownership amounts only to a level below 1 per cent of 204 companies in this sample.

The mean of the largest shareholder group (TOP1) shows that the ownership of the largest shareholder group amounts, on average, to more than 62 per cent. The maximum value of 99.6 per cent belongs to the group of investment advisors. Further, it can be stated that the shareholder structure of developed countries in the Asia-Pacific region is highly concentrated, which is demonstrated by the result of the variable shareholder concentration (TOP3). The three largest shareholder groups account for, on average, above 90 per cent ownership. Even the 25th percentile shows a value above 83 per cent.

The number of institutional investors (INST) displays that, on average, in every company there are 259 investors who are connected with an institutional association. With 1,053 institutional owners, the highest number of institutional investors in this sample belongs to the multinational conglomerate company Tencent Holdings Limited, which is listed on the HSI of Hong Kong. Contrary to this significant number of institutional investors, the New Zealand healthcare company Arvida Group Limited shows only 13 institutional investors.

Regarding the number of controlling shareholders (CONSH), the results display that the companies, on average, are owned by at least 10 family owners, private equity investors, or founders and executives with a threshold of shareholdings above the level of 5 per cent. The first of two control variables, market capitalisation (MCAP), shows that the market value of companies in developed Asia-Pacific countries amounts, on average, to more than USD 13 billion. However, the outlier with a market capitalisation of USD 471 billion is the same company – Tencent Holdings Limited, which is listed on the HIS of Hong Kong with the highest number of institutional investors. The company's market capitalisation amounts the twofold of the second highest market capitalisation of the company China Mobile Limited, which is also listed on the HSI.

Regarding the free cash flow per share (CFPS), there are 10 companies in the sample that show a negative free cash flow per share,

while eight companies show a free cash flow of zero. Consequently, these companies had no liquidity to pay dividends to their shareholders. However, despite having no liquidity, these companies did not hesitate to pay dividends to their shareholders. The highest dividend per share in these 18 companies was paid by the company Unibail-Rodamco-Westfield SE. The company paid USD 9.237 to each share – the highest dividend per share in the entire sample.

Research Model and Hypothesis

The study deals with the question if there is a relationship between the shareholder structure and the dividend policy and in which direction leads the respective relationship. Therefore, the study is going to examine which groups of shareholders are accountable for higher or lower dividend payments. The study pursues the same goal as the multiple linear regression, which means it wants to investigate whether there is a relationship between the response variable and several independent variables (Yan and Su, 2009). Therefore, the multiple linear regression model is used for the following examination with the equation:

$$\begin{aligned} \mathrm{DPS}_i \quad = \quad & \beta_1\,\mathrm{INVAD}_i + \beta_2\,\mathrm{BANK}_i + \\ & + \beta_3\,\mathrm{PEINS}_i + \beta_4\,\mathrm{GOV}_i + \\ & + \beta_5\,\mathrm{HEDG}_i + \beta_6\,\mathrm{CORP}_i + \\ & + \beta_7\,\mathrm{INDV}_i + \beta_8\,\mathrm{TOP1}_i + \\ & + \beta_9\,\mathrm{TOP3}_i + \beta_{10}\,\mathrm{INST}_i + \\ & + \beta_{11}\,\mathrm{CONSH}_i + \beta_{12}\,\mathrm{MCAP}_i + \\ & + \beta_{13},\mathrm{CFPS}_i + u_i \end{aligned}$$

The dependent variable which is represented by the dividend amount per share (DPS) and 11 independent variables which are represented by the shareholder groups of investment advisors (INVAD), banks (BANK), pension funds and insurance companies (PEINS), governments (GOV), hedge fund managers (HEDG), holding corporations (CORP), individual investors (INDV), largest shareholder group (TOP1), shareholder concentration (TOP3), institutional investors (INST), and controlling shareholders (CONSH), as well as the two control variables market capitalisation (MCAP) and free cash flow per share (CFPS), were created to examine whether there is a linear relationship between the dependent variable and the independent variables.

After the measures of the dividend policy and its determinants were determined and the research model have been chosen, the hypothesis for the following examination can be framed:

Hypothesis: The shareholder structure of developed markets in the Asia-Pacific region influences the dividend policy of companies.

Since it is necessary to evaluate the data sample for the following regression analysis, several assumptions need to be confirmed. As the results of the descriptive statistics show, it is apparent that the sample shows a considerable scattering and variances so that it is to be assumed that the collected data are not normally distributed. Therefore, it was necessary to transform the data of each variable to ensure that the results of the following multiple linear regression can be reasonably interpreted. The successful transformation is one of the assumptions that needs to be evaluated by regression diagnostics.

Regression diagnostics are used to assess the multiple linear regression model and thus to ensure its validity (Rencher and Schaalje, 2008). The multiple linear regression model is assuming normality, linearity, no autocorrelation, and homoscedasticity, as well as no collinearity (Dunn and Smyth, 2018). Correspondingly, regression diagnostics evaluate these five model assumptions. The statistical tests used to validate that the multiple linear regression analysis is the right research model for the sample are – Shapiro-Wilk test to verify normality, Ramsey-Reset test to verify linearity, Durbin-Watson test to confirm no autocorrelation, Breusch-Pagan test to uncover heteroscedasticity, and variance inflation factor to confirm no collinearity. The results of all tests conducted, which are provided in Tab. 5 in Annex, show that all five assumptions have been successfully validated. Hence, the regression diagnostics confirms that the chosen multiple linear regression model is the right statistic method for this data sample.

4 RESULTS AND DISCUSSION

The study aims to analyse whether there is a relationship between the shareholder structure and the dividend policies of companies in developed markets in the Asia-Pacific region for the financial year 2018.

The results of the multiple linear regression analysis show that three groups of shareholders show a *p*-value below the significant level of 5 per cent. Therefore, the dividend policies of companies in developed markets in the Asia-Pacific region has been influenced by at least three shareholder groups. Correspondingly, the hypothesis, framed in Chapter 3, can be accepted. Tab. 2 provides an overview of the outcomes of the multiple linear regression analyses.

As Tab. 2 shows, model 1 of the regression analysis considers both control variables market capitalisation and free cash flow per share. Model 2 includes all shareholder groups which are defined by the share proportion in a company. Model 3 considers in addition to the shareholder groups, the total number of institutional investors and controlling shareholders. Model 4 includes all variables of Model 1–3.

The results of model 4 shows that 5 of 13 examined independent variables demonstrate significant influence to the dividend policies of companies. Three out of five influencing factors are represented by the shareholder groups known as investment advisors (INVAD), governments (GOV), and individual investors (INVAD). Two out of these five predictors are finance-related and belong to the two control variables called market capitalisation (MCAP) and free cash flow per share (CFPS). All the five influencing factors are below the significant level of 5 per cent.

The group of investment advisors (INVAD) shows a *p*-value of 0.002 and hence a value below the 1 per cent level which means that the evidence of the influence of this group on the dividend policy is significant. The variables' estimated coefficient of 0.122 is positive and hence investment advisors positively influence the dividend per share of the year 2018. The value of the coefficient explains the effect of the respective independent variable on the dependent variable dividend per share (DPS). It means, in case the group of investment advisors rises by one unit, i.e. 100 basis points, the dividend per share rises by the coefficient of 0.122 USD. Further, the positive influence of this group confirms the finding of the study of Thanatawee (2012), that was conducted in the same region; however, in Thailand, an emerging market. Therefore, the statement can be met that investment advisors, which belongs to institutional investors and hence to majority investors, supporting higher dividend payments in both emerging and developed markets in Asia-Pacific.

The significant influencing shareholder group of government investors (GOV) displays a high coefficient 1.123 and hence a substantial effect on the dividend policy. The group's estimated influence on the dividend payments per share amounts to 1.123 USD. Besides, it is the highest value of the sample. It means this group is accountable for the strongest influence on the companies' dividend payments of developed countries in Asia-Pacific. The result leads to the conclusion that the likelihood of receiving dividends above the average is significantly greater in companies with higher government stake than in companies with a high stake of other shareholder groups. Besides, the result is consistent with the findings of the study of Thanatawee (2014) of the emerging market in China. The findings of his study display a positive relationship between the government stake and the companies' dividend payments as well. However, it is in contrary to the study of Turkey (Al-Najjar and Kılınçarslan, 2016) which shows a negative association. The reason for the results of the study of Turkey may lie in the continuous decrease of the Turkish lira, which leads to missing alternative investments, in particular, for government investors.

The results show further that dividend policy is also significantly driven by the group of individual investors (INDV) – this group exerts influence on dividend policy in a negative direction. It is the only group of all

Tab. 2: Influencing factors on dividend policy, linear regression model (dependent variable: dividend per share of 2018)

Independent Variables	Model 1	Model 2	Model 3	Model 4
INVAD (investment advisors)		0.119** (0.041)	0.122** (0.037)	0.122*** (0.038)
BANK (banks)		−0.105 (0.090)	−0.099 (0.088)	−0.096 (0.084)
PEINS (pension & insurance companies)		−0.029 (0.050)	−0.024 (0.049)	−0.022 (0.043)
GOV (coverment investors)		1.123** (0.377)	1.122** (0.378)	1.123** (0.376)
HEDG (hedge fund managers)		0.015 (0.027)	0.018 (0.027)	0.014 (0.024)
CORP (holding corporations)		0.049 (0.070)	0.041 (0.059)	0.041 (0.058)
INDV (individual investors)		−0.090** (0.059)	−0.089** (0.051)	−0.089** (0.051)
TOP1 (largest shareholder group)		0.049 (0.060)	0.050 (0.067)	0.054 (0.055)
TOP3 (shareholder concentration)		−0.359 (0.230)	−0.359 (0.220)	−0.384 (0.240)
INST (institutional investors)			−0.012 (0.053)	−0.011 (0.061)
CONSH (controlling shareholders)			−0.001 (0.019)	−0.004 (0.039)
MCAP (market capitalisation)	0.236*** (0.074)			0.235*** (0.078)
CFPS (free cash flow per share)	−0.563*** (0.036)			−0.565*** (0.041)
Number of companies	435	435	435	435
R^2	0.612	0.571	0.563	0.597

Note: *** denote significance below 1% level, ** denote significance at 5% level, * denote significance at 10% level.

significant influencing shareholder groups with adverse effects on the dividend policies of companies. The coefficient shows a negative value of −0.089, which is the lowest value among all significant influencing factors within the sample. Nevertheless, even though the coefficient of the group has the lowest value in the sample and therefore has the least influence, it is still significant. Consequently, the results show evidence that the group of small investors which represents all minority shareholders do not support high dividends in developed countries in Asia-Pacific. A reason for this could be the current low interest rate period and the consequent lack of alternative investments. Further, it confirms the results of Thanatawee (2012) in the market on Thailand as well as the results of the study in the market on Turkey (Al-Najjar and Kılınçarslan, 2016) in which dividend payments were also negatively driven by the group of minority shareholders.

Regarding the control variable market capitalisation (MCAP), the results show a p-value far below the 1 per cent level and an estimated coefficient of 0.235, which means that dividend payments are positively influenced by the enterprise value. It was expected as companies with a higher market capitalisation are commonly more established and have lower growth potential, and hence, lower investment requirements (Rashid and Islam, 2008). Lower investment requirements lead to higher liquidity, which is available for dividend disbursements to shareholders – the owners of the company.

The last significant influencing factor in this sample is the control variable called free cash flow per share (CFPS). The coefficient with a value of −0.565 shows a significantly negative influence on dividend policy. So, a higher free cash flow per share lets the firms pay lower dividends. It is controversial because a high free cash flow provides companies with the necessary liquidity to pay dividends to their shareholders. However, the result is consistent with studies on the developed market of Germany (Topalov, 2013) and the United States of America (Frankfurter et al., 2003) in which the dividend payments were also negatively affected by the free cash flow.

Robustness Check

In order to provide a robustness check of the analysis conducted, three additional examinations with the multiple linear regression analysis were carried out. The objective, timeframe, methodological approach and data sample of these additional analyses are equal to the present study. It means these three analyses were conducted – first in the emerging markets in Asia-Pacific – second in the developed markets in Europe – third in the emerging markets of Europe. The timeframe of all examinations was the year 2018 and the research objectives were the examination of the relationship between the shareholder structure and dividend policy. The outcomes of all examinations, are provided in Tab. 3.

As the results of Tab. 3 provide, the outcomes of the show similar results, in particular regarding the two control variables market capitalisation and free cash flow per share. In summary, it can be assumed that the robustness of the results of the multiple linear regression analysis could be confirmed.

5 CONCLUSION

This study aimed to examine whether the shareholder structure influences the dividend policy of companies in the developed markets within the Asia-Pacific region. The results demonstrate an extraordinary positive influence by government investors. Besides, the results also show a positive influence by the group of the investment advisors, which is, however, significantly lower. In contrary to these both groups of shareholders, minority shareholders, i.e. the group of individual investors, affects negatively the dividend policies of companies in the region. The reason might be the lack of alternative investment opportunities due to the low interest rate period in almost all developed markets, and in particular in the two major markets of firstly, Japan with a key interest rate of −0.10 per cent, set by Japan's central bank, and secondly, of Australia with a key interest rate of 0.75 per cent, set by Australia's central bank. Minority shareholders commonly do not have the necessary potential and knowledge to reinvest the received dividend payments abroad with similar investment opportunities as institutional investors have. Therefore, they might be interested that the company earnings remain and be reinvested to participate on the company's growth and hence the increase of its enterprise value.

Furthermore, it is apparent that minority shareholders and majority shareholders follow different goals in terms of the dividend policy. Besides, the financial literature, which met the statement that minority shareholders favour rather higher than lower dividend payments (Ellermann, 2003), could not be confirmed since as the results demonstrate, small shareholders favour lower dividends in developed markets of Asia-Pacific. The second statement of the financial literature that shareholders tend to extract the companies with their liquidity due to the lower investment requirements in developed markets (Baker and Powell, 2005), could only be confirmed for majority investors. The group of minority shareholders shows a contradictory picture in the present study.

In addition, both control variables market capitalisation and free cash flow per share show influence on the dividend policy as well but not in a consistent direction. The market

Tab. 3: Influencing factors on dividend policy in Asia-Pacific and Europe (dependent variable: dividend per share of 2018)

Independent Variables	Dev. markets Asia-Pacific	Emerg. markets Asia-Pacific	Dev. markets Europe	Emerg. markets Europe
INVAD (investment advisors)	0.122** (0.038)	0.017 (0.037)	−0.132** (0.053)	0.029 (0.038)
BANK (banks)	−0.096 (0.084)	0.020 (0.096)	−0.067 (0.072)	0.006 (0.032)
PEINS (pension & insurance companies)	−0.022 (0.043)	−0.012 (0.034)	−0.083*** (0.028)	−0.220** (0.096)
GOV (coverment investors)	1.123** (0.376)	−0.109 (0.096)	−0.013 (0.031)	−0.194** (0.072)
HEDG (hedge fund managers)	0.014 (0.024)	−0.071 (0.079)	−0.029 (0.048)	0.065 (0.083)
CORP (holding corporations)	0.041 (0.058)	−0.020** (0.008)	−0.085** (0.034)	0.001 (0.007)
INDV (individual investors)	−0.089** (0.051)	−0.018 (0.017)	−0.010 (0.056)	−0.032 (0.054)
TOP1 (largest shareholder group)	0.054 (0.055)	0.114* (0.063)	0.054 (0.053)	0.090 (0.086)
TOP3 (shareholder concentration)	−0.384 (0.240)	−0.103 (0.099)	−0.014 (0.065)	−0.077 (0.064)
INST (institutional investors)	−0.011 (0.061)	−0.262*** (0.046)	−0.055 (0.068)	0.094 (0.095)
CONSH (controlling shareholders)	0.004 (0.039)	−0.047* (0.026)	0.063** (0.031)	0.004 (0.080)
MCAP (market capitalisation)	0.235*** (0.078)	0.760*** (0.177)	0.233*** (0.076)	0.104 (0.076)
CFPS (free cash flow per share)	−0.565*** (0.041)	−0.655*** (0.055)	0.621*** (0.040)	0.691*** (0.058)
Number of obs.	435	703	644	105
R^2	0.597	0.607	0.681	0.665

Note: *** denote significance below 1% level, ** denote significance at 5% level, * denote significance at 10% level.

capitalisation shows, as expected, a positive influence, whereas the free cash flow per share affects the dividend policy negatively. The reason for the negative influence of free cash flow per share might be the same as for the group of minority shareholders. It means that the shareholders, who ultimately decide about the usage of the corporations' earnings, might prefer that the incomes remain within the companies, which leads to higher enterprise values because of no withdrawal of the company's equity capital. The increase of the enterprise values leads correspondingly to higher demand on the respective company shares and therefore to higher share values, which might be more profitable for the shareholders than dividend disbursements.

In conclusion, the study provides additional information for current and prospective shareholders, who like to invest in developed markets in the Asia-Pacific region. However, the lack of sufficient studies which focus on more than a single market needs to be filled. Therefore, it would be desirable if more studies deal with the entire region, however, with different timeframes in order to provide a clearer picture, especially for minority shareholders due to their detriment regarding the sources of information and financial knowledge.

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8 ANNEX

Tab. 4: Descriptive statistics of developed markets in Asia-Pacific

Variables	Mean	Median	Minimum	Maximum	25th Percentile	75th Percentile
DPS	0.411	0.242	0.001	9.237	0.109	0.469
INVAD	51.748	50.556	1.192	99.637	34.896	67.974
BANK	6.361	3.863	0.000	30.248	0.041	11.467
PEINS	1.902	0.876	0.000	42.677	0.476	1.238
GOV	9.870	6.202	0.000	94.706	2.256	11.550
HEDG	3.458	0.217	0.000	26.728	0.009	5.996
CORP	15.779	6.516	0.000	95.906	0.457	20.094
INDV	10.153	1.626	0.000	94.436	0.159	10.017
TOP1	62.469	60.375	2.235	99.637	49.263	76.728
TOP3	90.570	93.718	30.717	100	83.838	98.102
INST	259	274	13	1,053	117	363
CONSH	10	10	0	38	7	12
MCAP	13,215	4,941	240	471,455	1,946	12,635
CFPS	1.984	0.829	−1.189	28.039	0.242	2.578

Tab. 5: Regression diagnostics of developed markets in Asia-Pacific

Shapiro-Wilk normality test	W = 0.96788		p-value = 0.5016
Ramsey – Reset test	RESET = 1.3260	df1 = 3, df2 = 432	p-value = 0.212
Durbin-Watson test	DW = 2.0448		p-value = 0.558
Breusch-Pagan test	BP = 11.881	df = 13	p-value = 0.3522

Variance Inflation factor

INVAD	BANK	PEINS	GOV	HEDG	CORP	INDV
2.184683	2.806374	1.662682	2.455062	2.588667	2.510626	2.517416
INST	CONSH	TOP1	TOP3	MCAP	CFPS	
4.757153	1.355487	3.215313	5.137437	4.496969	1.655117	

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