

Work, Leisure, and the Monday Blue: Does Culture Matter?

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This paper finds that national culture differences can explain the variation in the cross-country day-of-the-week (DOW) effect. More specifically, countries with lower individualism and higher power distance index tend to have stronger DOW effect. We argue that in countries with lower individualism and higher power distance index, the distinction between weekend leisure and weekday work is more prominent, therefore leading to more pessimistic feelings on Mondays, and subsequently to stronger DOW effect. Our results support the Blue Monday hypothesis.

JEL code: G00, G14, G15

1. Introduction

A lot of business research has been conducted following Hofstede's seminal work on national culture. But only recently the finance literature starts to focus on the role of culture in financial decision-making, which has been largely overlooked in history. Early evidence about cultural element includes Grinblatt and Keloharju (2001), which study the culture for the 97 publicly-traded Finnish firms, and find that the influence of distance, language and culture is less prominent among the more sophisticated financial institutions than among less-sophisticated households and government/non-profit firms. Stulz and Williamson (2003) show that mostly Catholic countries protect the rights of creditors less effectively than mainly Protestant countries. Guiso, Sapienza and Zingales (2008) focus on trust as a cultural attribute for stock market participation: the most trusting, the greater the level of participation.

One of the earliest finance studies to employ the national cultural measures of Hofstede was by Chui, Titman and Wei (2010) in which the authors examine how cultural differences influence the returns of momentum strategies. They find that greater individualism is positively associated with higher trading volume, stock index return volatility and the magnitude of momentum profits. Eun, Wang, and Xiao (2015) study the relationship between culture and stock price synchronicity. The commonality, or average correlatedness, among individual stock returns is negatively related to individualism. Karolyi (2015) reviews what research has been done to date including a critical assessment of the key databases used to measure differences in national cultural values.

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This paper follows the above literature and tries to link the cross-country day-of-the-week (DOW hereinafter) effect to national culture. Generally, the DOW effect refers to the systematically lower Monday returns, or higher Friday returns, or both. Related literature dates back to French (1980) and Gibbons and Hess (1981), which provide early evidence of the DOW effect in the US market during the 1950s to 1970s. Afterward, more evidence begins to accumulate. Keim and Stambaugh (1984) find that Friday returns are lower when there is Saturday trading. Ariel (1990) finds that a significantly larger number of stocks rises preholiday than postholidays. The DOW effect is also observed in international markets. Hindmarch, Jentsch, and Drew (1984) document the DOW effect in the Canadian market. Jaffe and Westerfield (1985) find the DOW effect in the Canadian, British, Japanese, and Australian equity markets.

A number of rational explanations have been put forth for the DOW effect. For example, Keim and Stambaugh (1984) establish that the phenomenon has been a regular feature of the financial landscape for many years and they reject the possibility that it arises from measurement error. Keim (1989) finds that the bid-ask bounce can explain about 17 percent of the weekend effect. Lakonishok and Maberly (1990), Abraham and Ikenberry (1994) and Chan, Leung and Wang (2004) attribute part of the weekend effect to the differential trading patterns or holding preferences of institutions and individuals. Sias and Starks (1995) also document an association between the weekend effect and institutional ownership.

We contribute to the literature by providing the evidence that the national culture differences can explain the cross-country differences of the DOW effect. More specifically, countries with lower individualism or higher power distance index tend to have higher DOW effects. This result is robust over different methodologies. Our results provide support to the behavioral “Blue Monday” hypothesis of the DOW effect, which is discussed in earlier literature like Rystrom and Benson (1989) and Jacobs and Levy (1988). Blue Monday hypothesis argues that the majority of investors feel more pessimistic on Mondays than on other days of the week. Hence, they are less willing to buy or more willing to sell shares on Mondays compared to other days. Gondhalekar and Mehdian (2003) empirically test the relation between mood and the Monday effect, by the use of indirect proxies of mood: discounts on closed-end funds, returns on small stocks, consumer confidence and

consumer reluctance to buy a house. Bakar, Siganos and Vagenas-Nanos (2014) use Facebook index across 20 international markets and figure out that mood indeed explains a large variation of the DOW effects.

Based on the existing literature, we argue that the degree of Monday Blue depends on people's attitudes towards weekend leisure and weekday work. In a country where employees have a large degree of flexibility in their weekday work, they are more likely to enjoy working since work is more consistent with their interests. Therefore, the emotional difference between weekend leisure and weekday work is relatively small. In comparison to that, in a country where employees have a small degree of flexibility in their daily job, the work is something the employees have to do for a living, rather than something they like to do. The employees are therefore expecting the weekend leisure more enthusiastically to stay away, both emotionally and physically, from the weekday work. According to Biesheuvel (1984), one important difference between leisure and work is: "activities of leisure is an expression of what people want to do and not what they have to do." "A person is free to choose his leisure activities whereas the tasks he has to complete at work are normally given." Therefore, the key difference between work and leisure is the flexibility that people can do what they wanted to do, rather than being assigned to some job at the workplace. We, therefore, argue that in a culture where working environment is more flexible, the Monday blue is weaker, and therefore the DOW effect is weaker.

We check four culture dimensions from Hofstede (2005): individualism, power distance, masculinity and uncertainty avoidance. According to Hofstede (2005), in countries with high degrees of individualism and low power distance, employees have higher degrees of flexibility in work. Therefore, if the blue Monday hypothesis holds, we expect that the countries with high degrees of individualism and low power distances will have lower DOW effect. The empirical evidence is supportive, and the results are robust over different settings.

The rest of the papers is arranged as follows: Section 2 discusses the literature about culture dimensions and the Blue Monday hypothesis. Section 3 shows the empirical results, and section 4 concludes.

2. Literature review

2.1 Monday blue, leisure and work

The psychological viewpoints argue that people are in a happy mood on Fridays and a bad mood on Mondays. There are a number of studies from the psychology literature supporting the so-called 'Blue Monday' hypothesis. Earlier studies observe that mood tends to be lowest on Monday and highest on Friday and during the weekend (Farber, 1953). Daily mood does not randomly vary but fluctuates in a 7-day cycle that peaks around or close to the weekend and falls sharply on Monday and Tuesday (Croft and Walker, 2001; Larsen and Kasimatis, 1990; Reis et al., 2000; Stone et al., 1985). We further argue that the background reason for the Blue Monday hypothesis is that people expect more leisure time during weekends, and they are obliged to work during weekdays. This comparison of work and leisure is the point where culture kicks in to impact the DOW effect. Workers in different (dimensions of) cultures have distinct attitudes towards leisure versus work, therefore, we argue that cultures have impact on the different levels of DOW effects. More specifically, we find evidence supporting that countries with lower individualism or higher power distance index tend to have higher DOW effects.

As an introduction to the differences between work and leisure, Biesheuvel (1984) mentions that the consumption of energy per se is not unpleasant. As examples, physical types of sports like athletics, gymnastics, hunting, and jogging are used. According to Biesheuvel (1984), one important difference between leisure and work is "activities of leisure is an expression of what people want to do and not what they have to do." "A person is free to choose his leisure activities whereas the tasks he has to complete at work are normally given." Therefore, the key difference between work and leisure is the flexibility that people can do what they wanted to do, rather than being assigned to some job at the workplace. Therefore, the key difference between leisure and work lies in the flexibility that employee can freely choose what to do. According to the Blue Monday hypothesis, people feel blue on Mondays since they now have less freedom to do the activities they enjoy, but they are happy on Fridays since they now have more freedom. Along with this line, the DOW effect would be stronger if the flexibility of work is low. Since the difference between work (weekdays) and leisure (weekends) is smaller if the work is with more flexibility.

2.2 Culture dimensions and work flexibility

In this paper, we use four cultural dimensions documented in Hofstede (2005)² and discuss the relationship between cultural dimensions and work flexibility.

(1) Power Distance Index (PDI)

This dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally. The fundamental issue here is how a society handles inequalities among people.

People in societies exhibiting a large degree of Power Distance accept a hierarchical order in which everybody has a place and which needs no further justification. In societies with low Power Distance, people strive to equalize the distribution of power and demand justification for inequalities of power.

In organizations with high power distance, “employees acknowledge their lesser standing, and are respectful and submissive towards their superiors; who in turn, are more likely to give orders rather than consult with their employees while making decisions”³. Status symbols are often displayed and flaunted. Employers or managers would not have meals together with their subordinates and might have private facilities such as rooms, parking lots, and elevators. Having a high level of education is important to climb the corporate ladder, and the higher-ranking members of the organization are often paid much more than their employees in comparison with companies with lower power distance.

² In addition to the four culture dimensions, Hofstede (2005) also has a fifth dimension of culture: Long term vs short term orientation. Every society has to maintain some links with its own past while dealing with the challenges of the present and the future. Societies prioritize these two existential goals differently. Societies who score low on this dimension, for example, prefer to maintain time-honored traditions and norms while viewing societal change with suspicion. Those with a culture which scores high, on the other hand, take a more pragmatic approach: they encourage thrift and efforts in modern education as a way to prepare for the future. However, Hofstede (2005) only contains 40 countries for this dimension and only 33 out of the 40 countries are used in our sample. Therefore, we do not use this dimension of culture in our paper.

³ see https://en.wikipedia.org/wiki/Power_distance

On the other hand, in businesses with low power distance, bosses are not as concerned with status symbols and would be more open to employee discussion and participation. Employees are less submissive to their superiors and are more likely to make themselves heard or to challenge the management (Velo, 2011).

In the large-power-distance-situation, superiors and subordinates consider each other as existentially unequal; the hierarchical system is based on this existential inequality. Subordinates expected to be told what to do. In comparison to that, in the small-power-distance situation, subordinates and superiors consider each other as existentially equal; the hierarchical system is just an inequality of roles, established for convenience, and roles may be changed. Subordinates expect to be consulted before a decision is made that affects their work (Hofstede, 2005).

From this quote, we understand that the workplace environments are different to employees in large-power-distance and small-power-distance countries. In large-power-distance countries, people have less power and have to follow the instructors from the superiors and have less freedom.

(2) Individualism (IDV)

Individualism can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. Its opposite, collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular ingroup to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we."

In individualism countries, employees' companies did recognize their particular interests and skills and try to use that information when placing them in their jobs. In collectivism countries, employees are assigned job contents, and the flexibility is minimal. Therefore, in terms of the flexibility of doing what people want to do, leisure > individualism work > collectivism work. The difference between work and leisure is more prominent in collectivism countries. Therefore, the blue Monday effect would be stronger for collectivism countries than for the individualism

countries. That is, the testable hypothesis is, the DOW effect is stronger for the collectivism countries.

Also, it is mentioned by Hofstede (2005) (Table 3.4, page 104) that in individualism countries, occupational mobility is higher. Moreover, the employees will pursue the employer's interest if it coincides with their self-interest, meaning again that the work environment in the individualism countries is more flexible.

(3) Masculinity (MAS)

The Masculinity side of this dimension represents a preference in society for achievement, heroism, assertiveness, and material rewards for success. Society at large is more competitive. Its opposite, Femininity, stands for a preference for cooperation, modesty, caring for the weak and quality of life. Society at large is more consensus-oriented. In the business context, Masculinity versus Femininity is sometimes also related to as "tough versus tender" cultures. According to Hofstede (2005), there is no clear connection between masculinity and work flexibility.

(4) Uncertainty avoidance index (UAI)

The Uncertainty Avoidance dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong UAI maintain rigid codes of belief and behavior, and are intolerant of unorthodox behavior and ideas. Weak UAI societies maintain a more relaxed attitude in which practice counts more than principles. According to Hofstede (2005), there is no clear connection between masculinity and work flexibility.

3. Empirical analysis

3.1 The data

There are four different data sources used in this paper. First, the culture data used in this paper are from Hofstede (2005). Second, the stock index data used in this paper are from Bloomberg.

Our sample contains 52 markets' benchmark indices, and the sample period is from January 1, 1982 (or the earliest record in the Bloomberg, whichever is later), till December 31, 2014. The indices used in the sample, the starting date in Bloomberg, as well as the daily continuously compounded returns are listed in the Appendix of this paper. The third dataset we use in this paper is the individual stock daily return data, which comes from Datastream. Fourth, the economic and political control variables come from the World Bank website.

3.2 Empirical results

3.2.1 Correlation

We first check the correlation between the culture dimensions and the country-wide economic and political measures. The reason why we introduce these economic and political measures might, not-surprisingly, be related to the cultural dimensions. In order to separate the effects of culture from those from the economic and political factors, we will have to control these factors.

The economic factors used in this paper include logged GDP and population. The political factors used in this paper include control of corruption, rule of law, regulatory quality, government effectiveness, political stability, voice and accountability. *Control of corruption*: reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. *Rule of law* reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. *Regulatory quality* reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. *Government effectiveness* reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. *Political stability* measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. *Voice and accountability* reflect perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association,

and a free media. All the annual economic and political measures come from the World Bank. The results are shown in Table 2.

(Insert Table 2)

We can see from Table 2 that three out of the four cultural measure, IDV, PDI and UAI, are significantly correlated with most of the economic and political measures.

3.2.2 The existence of DOW effect

We now test whether the DOW effect exists in the sample countries. We adopt the following regression:

$$r_{it} = \alpha_i + \beta_{i2}Tue_t + \beta_{i3}Wed_t + \beta_{i4}Thu_t + \beta_{i5}Fri_t + \varepsilon_{it}$$

where r_{it} is the continuous compounded daily return of market i on date t . Tue_t is a dummy variable which equals 1 if date t is a Tuesday and 0 otherwise. Wed_t is a dummy variable which equals 1 if date t is a Wednesday and 0 otherwise. Thu_t is a dummy variable which equals 1 if date t is a Thursday and 0 otherwise. Fri_t is a dummy variable which equals 1 if date t is a Friday and 0 otherwise. ε_{it} is the error term. Therefore, the coefficient of Fri_t captures the difference between Friday returns and Monday returns. β_{i5} is therefore our measure of DOW effect. A positive and significant β_{i5} implies that the Friday returns are significantly higher than the Monday returns. The results are shown in Table 3. We first run the regression for each country, and obtain the β_{i5} for each country i . Panel A of Table 3 shows the mean DOW effect. Of the 52 sample countries, the mean effect is 11.8 basis points, which is significant at 1%, indicating that the DOW effect does effect on average. Panel B of Table 3 shows the results of the country-by-country DOW effect. Of all the 52 countries, 45 have positive DOW effect, and 26 of them are significantly positive, further proving the existence of the DOW effects.

3.2.3 The DOW effect the cultural dimensions

In this section, we directly test whether the degrees of different cultural dimensions have any impact on the DOW effects. For each market i , we run the following regression

$$r_{it} = \alpha_i + \beta_{i2}Tue_t + \beta_{i3}Wed_t + \beta_{i4}Thu_t + \beta_{i5}Fri_t + \varepsilon_{it} \quad (1)$$

where r_{it} is the continuous compounded daily return of market i on date t . Mon_t is a dummy variable which equals 1 if date t is a Monday and 0 otherwise. Fri_t is a dummy variable which equals 1 if date t is a Friday and 0 otherwise. ε_{it} is the error term. Then, define the day-of-the-week effect of market i as $dow_i = \beta_{i5}$, which is the difference between Friday return and the preceding Monday return. Then we run the following regression:

$$DOW_i = \gamma + \theta Culture_i + v_i \quad (2)$$

where $Culture_i$ are the culture measures, including individualism (IDV), power distance index (PDI), muscularity (MAS), and uncertainty avoidance index (UAI). The null hypothesis is: the cultural measures have no impact on the country-wide DOW effect. The results are shown in Table 4 and Figure 1.

(Insert Table 4 and Figure 1)

The results of Table 4 show that the coefficient of individualism (IDV) is significantly negative, and that of power distance index (PDI) is significantly positive. The coefficients for MAS and UAI are insignificant. The results indicate that the cross-country culture difference can explain the variation of DOW effect. More specifically, countries with higher degrees of individualism tend to have lower DOW effects, while countries with higher power distance index tend to have higher DOW effects. The results support the blue Monday hypothesis that the DOW effect is stronger in countries with less flexible working environment (i.e., low IDV, high PDI countries), due to the fact that those less flexible working environments make a greater distinction between weekday work and weekend leisure, and the Monday Blue is stronger.

We further adopt an alternative setting to test the robustness of the cultural impact. For each market i , we run the following regression

$$r_{it} = \alpha + \beta_2 Tue_t + \beta_3 Wed_t + \beta_4 Thu_t + \beta_5 Fri_t + \gamma Culture_i + \theta Fri_t * Culture_i + \delta' Control_{it} + \varepsilon_{it}$$

where r_{it} is the continuous compounded daily return of market i on date t . Tue_t is a dummy variable which equals 1 if date t is a Tuesday and 0 otherwise. Wed_t is a dummy variable which equals 1 if date t is a Wednesday and 0 otherwise. Thu_t is a dummy variable which equals 1 if date t is a Thursday and 0 otherwise. Fri_t is a dummy variable which equals 1 if date t is a Friday and 0 otherwise. ε_{it} is the error term. $Culture_i$ are the culture measures, including individualism (IDV), power distance index (PDI), muscularity (MAS), and UAI. $Control_{it}$ are the control variables, including economic measures and political measures. Economics measures are from the World Bank, including GDP and population, where GDP is the logged value of the annual current US dollar GDP (in billions). Population is the logged value of annual population (in millions). The following measures are all the political measures. Due to the facts that in the political measures only cover limited number of years dating back to 1996, and that the time-series variation within each country is small, we use the average value of the annual political measure for each country i . For each measure, the value ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. More details are described in the World Bank website. The political measures include the following items. *Control of corruption*: reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. *Rule of law* reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. *Regulatory quality* reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. *Government effectiveness* reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. *Political stability* measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. *Voice and accountability* reflects perceptions of the extent to which a country's citizens are able to participate in selecting their

government, as well as freedom of expression, freedom of association, and a free media. The model is estimated using PCSE, and the results are shown in Table 5.

(Insert Table 5)

The results in Table 5 provide further supports to the Monday blue hypothesis. In specifications (2), the interaction term of $IDV*Fri_t$ is significantly negative, meaning that countries with higher individualism tend to experience weaker DOW effect. In specification (3), the interaction term of $PDI*Fri_t$ is significantly positive, meaning that countries with higher individualism tend to experience stronger DOW effect, even after controlling economic and political factors.

4. Robustness checks

4.1 The DOW effect the cultural dimensions: GARCH results

In the literature of DOW effect, time-varying volatility can be documented in the stock return data, and a homoskedastic error structure for conditional distributions is rejected (see French, Schwert, and Stambaugh, 1987, among others). Therefore, GARCH model (Bollerslev, 1986) is a natural candidate to be applied to our paper. Recent weekend effect literature has extensively applied GARCH to capture the above-mentioned distribution property (see Najand and Yung, 1994, among others). Specifically, the model is expressed as follows:

$$r_{it} = \alpha_i + \beta_{i2}Tue_t + \beta_{i3}Wed_t + \beta_{i4}Thu_t + \beta_{i5}Fri_t + \varepsilon_{it}$$

$$\varepsilon_{it} | \Phi_{it-1} \sim N(0, h_{it})$$

$$h_{it} = \alpha_{i0} + \alpha_{i1}\varepsilon_{it-1}^2 + \alpha_{i2}h_{it-1}$$

where is r_{it} the continuously compounded daily index return for index i , day t . Tue_t is a dummy variable which equals 1 if date t is a Tuesday and 0 otherwise. Wed_t is a dummy variable which equals 1 if date t is a Wednesday and 0 otherwise. Thu_t is a dummy variable which equals 1 if date t is a Thursday and 0 otherwise. Φ_{it-1} is the period $t-1$ information set for event stock i , and h_{it} is the variance of the errors of index i , day t . The DOW effect of market i is defined as $dow_i =$

β_{i5} , which is the difference between Friday return and the preceding Monday return. Then we run the following regression:

$$DOW_i = \gamma + \theta \text{ Culture}_i + v_i \quad (2)$$

where Culture_i are the culture measures, including individualism (IDV), power distance index (PDI), muscularity (MAS), and UAI. The null hypothesis is: the cultural measures have no impact on the country-wide DOW effect. The results are shown in Table 6.

(Insert Table 6)

Table 6 shows highly consistent results as Table 4: the coefficient of individualism (IDV) is significantly negative, and that of power distance index (PDI) is significantly positive. The coefficients for MAS and UAI are insignificant. The results indicate that the cross-country culture difference can explain the variation of the cross-country DOW effect.

4.2 The DOW effect and the R^2

One further testable hypothesis about the Monday blue is from the perspective of price synchronicity. Gondhalekar and Mehdiian (2003) argue that concurrent mood among investors such as the Monday blues could be one such risk that is systematic (i.e., affects the cross section of stocks simultaneously), but is not a market risk (i.e., not fully captured by the variation in the market return). If the Monday blues are a source of non-diversifiable risk, the proportion of non-diversifiable risk would be higher on Mondays and lower on Non-Mondays.

First, we run the following regressions:

$$r_{it \in \text{Mondays}} = \beta_0 + \beta_1 r_{mt} + \varepsilon_{it} \quad (1)$$

$$r_{it \in \text{Non-Mondays}} = \gamma_0 + \gamma_1 r_{mt} + v_{it} \quad (2)$$

where $r_{it \in \text{Mondays}}$ is the continuously compounded daily return for index i on date t , if t is a Monday. $r_{it \in \text{Non-Mondays}}$ is the continuously compounded daily return for index i on date t , if t is not a Monday. r_{mt} is the continuously compounded daily return on Datastream's world market index on date t . We define $R_{i, \text{Monday}}^2$ as the adjusted R^2 of model (1), and $R_{i, \text{Non-Monday}}^2$ as the adjusted R^2 of model (2). Then further define country i 's price synchronicity difference between Mondays and Non-Mondays as: $gap_{iR} = R_{i, \text{Monday}}^2 - R_{i, \text{Non-Monday}}^2$.

Table 7 reports the results of

- (1) The comparison between $R_{i, \text{Monday}}^2$ and $R_{i, \text{Non-Monday}}^2$
- (2) The relationship between gap_{iR} and culture measures.

(Insert Table 7)

Panel A of Table 7 shows that, the $R_{i, \text{Monday}}^2$ is significantly higher than $R_{i, \text{Non-Monday}}^2$. The mean $R_{i, \text{Monday}}^2$ is 43.55%, while the mean $R_{i, \text{Non-Monday}}^2$ is 35.57%, the test for equality is rejected at 1%. Similarly, the median $R_{i, \text{Monday}}^2$ is 24.67%, while the median $R_{i, \text{Non-Monday}}^2$ is 22.72%. The difference is also significant at 1%. The results of Panel A, Table 7 further support Gondhalekar and Mehdian (2003)'s results

Panel B of Table 7 shows the channels how culture impacts the price synchronicity. Specifications (1) and (2) show that the gap of R_i^2 between Mondays and Non-Mondays is lower for high individualism and higher for high power distance countries, which makes perfect sense in supporting the blue Monday hypothesis. In specifications (3) and (4), UAI and MAS do not have any impact on the gap of R_i^2 between Mondays and Non-Mondays. The results are highly consistent with previous ones.

5. Conclusion

This paper studies the relationship between country-wide culture measures and the DOW effect. We use four culture measures from Hofstede (2005): individualism, power distance, masculinity, and uncertainty avoidance. We find that the DOW effect is stronger in countries with low individualism and high power distance index. But masculinity and uncertainty avoidance seem to

have no impact on the DOW effect. Our results support the Blue Monday hypothesis of the DOW effect: investors feel sad on Mondays and feel happy on Fridays since they like the weekend leisure and dislike the weekday work. However, in countries with high individualism and low power distance index, employees have higher flexibility in work and the difference between weekend leisure and weekday work is not strong, therefore the DOW effect is weaker. Our results are robust over different specifications.

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Figure 1: Scatter plot of DOW and culture

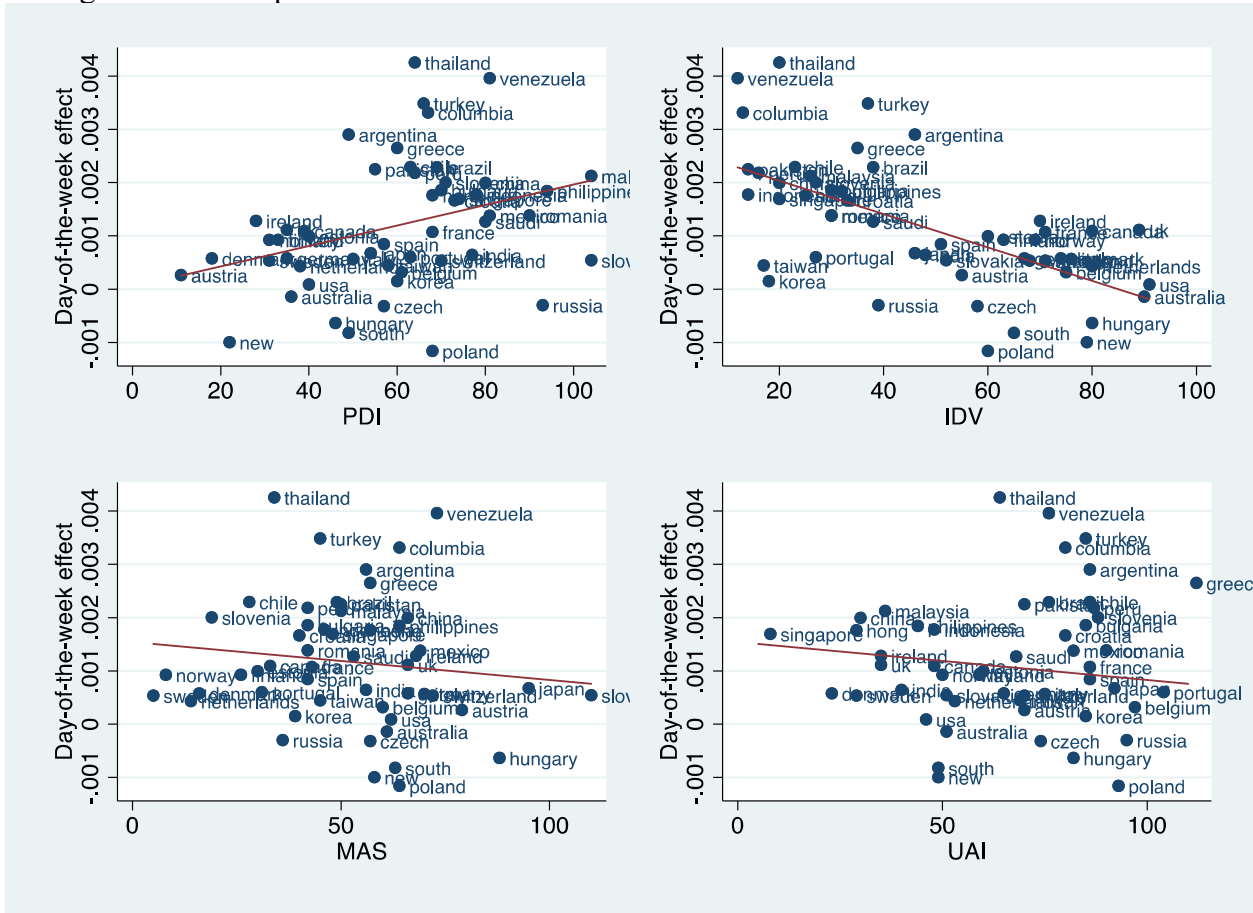


Table 2: Correlation between the culture measures and the economic and political measures

This table shows the correlation coefficients between the four culture measures by Hofstede (2005) and the country-wise economics and political measures. Economics measures are from the World Bank, including GDP and population, where GDP is the logged value of the annual current US dollar GDP (in billions). Population is the logged value of annual population (in millions). The following measures are all the political measures. Due to the facts that in the political measures only cover limited number of years dating back to 1996, and that the time-series variation within each country is small, we use the average value of the annual political measure for each country *i*. For each measure, the value ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. More details are described in the World Bank website. The political measures include the following items. *Control of corruption*: reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. *Rule of law* reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. *Regulatory quality* reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. *Government effectiveness* reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. *Political stability* measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. *Voice and accountability* reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.

		IDV	PDI	MAS	UAI
Culture measures	IDV	1			
	PDI	-0.6344*	1		
	MAS	0.0623	0.2043	1	
	UAI	-0.2297	0.2043	0.0638	1
Economics and Political measures	GDP	0.3492*	-0.1633	0.1661	-0.0564
	Population	-0.1763	0.2929*	0.2409	0.0137
	Control of corruption	0.6474*	-0.6790*	-0.2255	-0.3624*
	Rule of law	0.6667*	-0.6610*	-0.1929	-0.3032*
	Regulatory quality	0.6164*	-0.6044*	-0.153	-0.3163*
	Government effectiveness	0.6282*	-0.6113*	-0.1809	-0.3749*
	Political stability	0.5805*	-0.5054*	-0.1006	-0.1696
Voice and accountability	0.7008*	-0.6521*	-0.136	-0.0131	

Note: * represents significance level of 5%.

Table 3: The existence of the DOW effect

This table shows the regression results. For each market i , we run the following regression

$$r_{it} = \alpha_i + \beta_{i2}Tue_t + \beta_{i3}Wed_t + \beta_{i4}Thu_t + \beta_{i5}Fri_t + \varepsilon_{it}$$

where r_{it} is the continuous compounded daily return of market i on date t . Tue_t is a dummy variable which equals 1 if date t is a Tuesday and 0 otherwise. Wed_t is a dummy variable which equals 1 if date t is a Wednesday and 0 otherwise. Thu_t is a dummy variable which equals 1 if date t is a Thursday and 0 otherwise. Fri_t is a dummy variable which equals 1 if date t is a Friday and 0 otherwise. ε_{it} is the error term.

Panel A: Summary statistics

	Mean value (%)	# of obs	# Positive	# Positive and significant
β_{i5}	0.118*** [7.07]	52	45	26

Panel B: Market-by-market statistics

country1	β_{i5}	t-value	p-value	country1	β_{i5}	t-value	p-value
argentina	0.0029	3.18	0.001	malaysia	0.0021	3.73	0.000
australia	-0.0001	-0.35	0.730	mexico	0.0014	2.03	0.042
austria	0.0003	0.52	0.606	netherlands	0.0004	0.74	0.459
belgium	0.0003	0.67	0.505	New zealand	-0.0010	-2.32	0.020
brazil	0.0023	2.31	0.021	norway	0.0009	1.38	0.169
bulgaria	0.0019	2.19	0.029	pakistan	0.0023	3.23	0.001
canada	0.0011	3.17	0.002	peru	0.0022	3.29	0.001
chile	0.0023	6.97	0.000	philippines	0.0018	2.96	0.003
china	0.0020	2.29	0.022	poland	-0.0012	-1.45	0.146
columbia	0.0033	4.15	0.000	portugal	0.0006	1.22	0.221
croatia	0.0017	2.24	0.025	romania	0.0014	1.57	0.117
czech	-0.0003	-0.51	0.608	russia	-0.0003	-0.25	0.803
denmark	0.0006	1.22	0.223	saudi	0.0013	1.81	0.071
estonia	0.0010	1.35	0.176	singapore	0.0017	2.74	0.006
finland	0.0009	1.48	0.139	slovakia	0.0005	0.85	0.396
france	0.0011	2.00	0.045	slovenia	0.0020	3.09	0.002
germany	0.0006	1.20	0.231	south	-0.0008	-1.44	0.149
greece	0.0027	3.62	0.000	spain	0.0008	1.59	0.112
hong	0.0018	3.02	0.003	sweden	0.0005	0.96	0.338
hungary	-0.0006	-0.92	0.357	switzerland	0.0005	1.18	0.237
india	0.0006	1.04	0.297	taiwan	0.0004	0.85	0.397
indonesia	0.0018	3.31	0.001	thailand	0.0043	6.57	0.000
ireland	0.0013	2.56	0.011	turkey	0.0035	3.37	0.001
italy	0.0006	0.75	0.454	uk	0.0011	2.78	0.006
japan	0.0007	1.51	0.132	usa	0.0001	0.23	0.821
korea	0.0002	0.31	0.758	venezuela	0.0040	5.09	0.000

Table 4: DOW and culture

This table shows the regression results. For each market i , we run the following regression

$$r_{it} = \alpha_i + \beta_{i2}Tue_t + \beta_{i3}Wed_t + \beta_{i4}Thu_t + \beta_{i5}Fri_t + \varepsilon_{it} \quad (1)$$

where r_{it} is the continuous compounded daily return of market i on date t . Mon_t is a dummy variable which equals 1 if date t is a Monday and 0 otherwise. Fri_t is a dummy variable which equals 1 if date t is a Friday and 0 otherwise. ε_{it} is the error term. Then, define the day-of-the-week effect of market i as $dow_i = \beta_{i5}$, which is the difference between Friday return and the preceding Monday return. Then we run the following regression:

$$DOW_i = \gamma + \theta Culture_i + v_i \quad (2)$$

where $Culture_i$ are the culture measures, including individualism (IDV), power distance index (PDI), muscularity (MAS), and UAI.

DOW_i	(1)	(2)	(3)	(4)
IDV	-0.0000313*** [-5.85]			
PDI		0.0000192*** [3.14]		
MAS			-0.00000709 [-1.07]	
UAI				0.00000429 [0.69]
Constants	0.00266*** [8.35]	0.000041 [0.12]	0.00154*** [4.34]	0.000894** [2.30]
No. of obs	52	52	52	52
F-values	34.17	9.852	1.145	0.48

Note: *, ** and *** represent significance levels of 10%, 5%, and 1%, respectively. t-values are shown in parentheses.

Table 5: DOW, culture and other factors

This table shows the regression results. For each market i , we run the following regression

$$r_{it} = \alpha + \beta_2 Tue_t + \beta_3 Wed_t + \beta_4 Thu_t + \beta_5 Fri_t + \gamma Culture_i + \theta Fri_t * Culture_i + \delta' Control_{it} + \varepsilon_{it}$$

where r_{it} is the continuous compounded daily return of market i on date t . Tue_t is a dummy variable which equals 1 if date t is a Tuesday and 0 otherwise. Wed_t is a dummy variable which equals 1 if date t is a Wednesday and 0 otherwise. Thu_t is a dummy variable which equals 1 if date t is a Thursday and 0 otherwise. Fri_t is a dummy variable which equals 1 if date t is a Friday and 0 otherwise. ε_{it} is the error term. $Culture_i$ are the culture measures, including individualism (IDV), power distance index (PDI), muscularity (MAS), and UAI. $Control_{it}$ are the control variables, including economics measures and political measures. Economics measures are from the World Bank, including GDP and population, where GDP is the logged value of the annual current US dollar GDP (in billions). Population is the logged value of annual population (in millions). The following measures are all the political measures. Due to the facts that in the political measures only cover limited number of years dating back to 1996, and that the time-series variation within each country is small, we use the average value of the annual political measure for each country i . For each measure, the value ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance. More details are described in the World Bank website. The political measures include the following items. *Control of corruption*: reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. *Rule of law* reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. *Regulatory quality* reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. *Government effectiveness* reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. *Political stability* measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. *Voice and accountability* reflects perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. The model is estimated using PCSE.

DOW_i	(1)	(2)	(3)	(4)	(5)
Fri_t	0.00114*** [12.9]	0.00199*** [12.0]	0.000407** [2.11]	0.00146*** [7.97]	0.000951*** [4.63]
IDV* Fri_t		-0.0000177*** [-6.72]			
PDI* Fri_t			0.0000126*** [3.93]		
MAS* Fri_t				-0.00000631** [-2.04]	
UAI* Fri_t					0.00000288 [0.96]
Tue_t	0.000293*** [3.36]	0.000289*** [3.31]	0.000293*** [3.36]	0.000292*** [3.35]	0.000295*** [3.38]
Wed_t	0.000671*** [7.70]	0.000667*** [7.65]	0.000671*** [7.70]	0.000670*** [7.69]	0.000673*** [7.73]
Thu_t	0.000584*** [6.67]	0.000579*** [6.62]	0.000584*** [6.68]	0.000583*** [6.66]	0.000585*** [6.69]
Fri_t	0.000293*** [3.36]	0.000289*** [3.31]	0.000293*** [3.36]	0.000292*** [3.35]	0.000295*** [3.38]
Controls	yes	yes	yes	yes	Yes
Constants	0.000713*** [4.88]	0.000535*** [3.60]	0.00105*** [5.16]	0.000640*** [4.24]	0.000403** [2.20]
# of obs	310291	310291	310291	310291	310291

Note: *, ** and *** represent significance levels of 10%, 5%, and 1%, respectively. t-values are shown in parentheses.

Table 6: DOW and culture using GARCH model

This table shows the regression results. For each market i , we run the following regression

$$r_{it} = \alpha_i + \beta_{i2}Tue_t + \beta_{i3}Wed_t + \beta_{i4}Thu_t + \beta_{i5}Fri_t + \varepsilon_{it} \quad (1)$$

where r_{it} is the continuous compounded daily return of market i on date t . Mon_t is a dummy variable which equals 1 if date t is a Monday and 0 otherwise. Fri_t is a dummy variable which equals 1 if date t is a Friday and 0 otherwise. ε_{it} is the error term. Then, define the day-of-the-week effect of market i as $dow_i = \beta_{i5}$, which is the difference between Friday return and the preceding Monday return. Then we run the following regression:

$$DOW_i = \gamma + \theta Culture_i + v_i \quad (2)$$

where $Culture_i$ are the culture measures, including individualism (IDV), power distance index (PDI), muscularity (MAS), and UAI.

DOW_i	(1)	(2)	(3)	(4)
IDV	-0.0000255*** [-4.84]			
PDI		0.0000123* [1.93]		
MAS			-0.00000969 [-1.52]	
UAI				-1.61E-06 [-0.28]
Constants	0.00166*** [5.30]	-0.000274 [-0.81]	0.000946*** [2.75]	0.000557 [1.55]
No. of obs	52	52	52	52
F-values	23.46	3.721	2.311	0.0765

Note: *, ** and *** represent significance levels of 10%, 5%, and 1%, respectively. t-values are shown in parentheses.

Table 7: Monday Blues, price synchronicity and culture

we run the following regressions:

$$r_{ijt \in \text{Mondays}} = \beta_{0i} + \beta_{1i} mr_{it} + \varepsilon_{ijt} \quad (1)$$

$$r_{ijt \in \text{Non-Mondays}} = \gamma_{0i} + \gamma_{1i} mr_{it} + \nu_{ijt} \quad (2)$$

where $r_{ijt \in \text{Mondays}}$ is the continuously compounded daily return for market i , stock j on date t , if t is a Monday. $r_{ijt \in \text{Non-Mondays}}$ is the continuously compounded daily return for market i , stock j on date t , if t is not a Monday. mr_{it} is the continuously compounded daily return on market i 's benchmark index on date t . We define $R_{i, \text{Monday}}^2$ as the equally weighted adjusted R^2 of model (1) for all stocks in market i , and $R_{i, \text{Non-Monday}}^2$ as the equally weighted adjusted R^2 of model (2) for all stocks in market i . Then further define country i 's price synchronicity difference between Mondays and Non-Mondays as: $gap_{iR} = R_{i, \text{Monday}}^2 - R_{i, \text{Non-Monday}}^2$.

Then we run the following regression:

$$gap_{iR} = \theta_0 + \theta_1 Culture_i + u_i \quad (3)$$

where $Culture_i$ are the culture measures: individualism (IDV) and power distance index (PDI).

Panel A: Comparison between R^2 , beta and SSR

R^2	Mondays	Non-Mondays	t-value
Mean	0.4355	0.3557	-4.11***
Median	0.2467	0.2272	-3.97***

Panel B: Regression

gap_{iR}	(1)	(2)	(3)	(4)
IDV	-0.000197** [-2.42]			
PDI		0.000233** [2.11]		
MAS			-0.0000193 [-0.28]	
UAI				-0.0000831 [-0.90]
Constants	0.0182*** [3.16]	-0.00537 [-0.99]	0.00894** [2.33]	0.0133** [2.03]
No. of obs	38	38	38	38
F-values	5.856	4.433	0.0799	0.815

Note: *, ** and *** represent significance levels of 10%, 5%, and 1%, respectively. t-values are shown in parentheses.

Appendix 1: Information about the International Market Indices

This table contains the information about the benchmark indices for all 61 countries used in the paper. It reports (1) the name, (2) the starting date from Bloomberg, and (3) the mean daily return.

Country	Index Name	Starting date in Bloomberg (YYYYMMDD)	Mean daily return (%)
Argentina	BURCAP	19930104	0.074
Australia	ASX200	19920601	0.020
Austria	AUSTRIA TRADED IDX	19860601	0.016
Bahrain	BHSEASI	20060610	0.020
Belgium	BEL20	19910102	0.084
Brazil	BOVESPA	19880321	0.047
Bulgaria	SOFIX	20001025	0.024
Canada	TSE COMP	19300203	-0.002
Chile	GENERAL IGPA	19900103	0.051
China	SHANGHAI COMP	19901220	0.032
Columbia	COLCAP	20020617	0.078
Croatia	CROBEX	20020618	0.012
Czech	PRAGUE SE	19940407	-0.001
Denmark	OMX 20	19900610	0.031
Egypt	HERMES	19930318	0.066
England	FTSE100	19840103	0.033
Estonia	TALLINN	19960604	0.048
Finland	HELSINKI	19870105	0.029
France	CAC 40	19870710	0.015
Germany	DAX	19591002	0.036
Greece	ASE INDEX	19870105	0.027
Hong Kong	HANGSENG	19640831	0.043
Hungary	BUX	19910103	0.047
India	SENSEX	19790404	0.063
Indonesia	JAKARTA COMP	19830405	0.049
Ireland	ISEQ	19830112	0.039
Italy	FTSE MIB	19980102	-0.006
Japan	TOPIX	19490517	0.011
Jordan	AMMAN SE	20000102	0.022
Korea	KOSPI	19800105	0.040
Lebanon	BLOM	19960123	-0.006
Lithuania	OMX VILNIUS	20000105	0.011
Malaysia	FTSE EMAS	19960102	0.022
Mexico	IPC	19940120	0.040
Netherlands	AMSTERDAM	19951005	0.019
New Zealand	NZX15 GROSS	20011002	0.038
Nigeria	NIGERIA IDX	19980105	0.042

Norway	OBX BENCHMARK	19960103	0.036
Pakistan	KSE100	19911105	0.063
Peru	GENERAL BVL	19900103	0.170
Philippines	PSEI	19870105	0.040
Poland	WIG20	19940607	0.016
Portugal	PSI20	19930104	0.009
Qatar	DSM INDEX	19980811	0.054
Romania	BET INDEX	19970923	0.051
Russia	RTS STANDARD	19950904	0.115
Saudi Arabia	TADAWUL	19940130	0.032
Singapore	STRAITS TIME	19990901	0.011
Slovakia	SLOVAKIA SHARE	19930922	0.010
Slovenia	SBITOP	20030402	0.012
South Africa	FTSE JSE	19950703	0.048
Spain	IBEX35	19870107	0.022
Sweden	OMX30	19861219	0.035
Switzerland	SWITZERLAND IDX	19880704	0.027
Taiwan	TAIEX	19670106	0.032
Thailand	THAILAND SET	19870703	0.023
Tunisia	TUNIS	19990414	0.044
Turkey	ISTANBUL100	19880105	0.140
Ukraine	PFTS INDEX	19980113	0.033
United States	S&P500	19300103	0.037
Venezuela	CARACAS INDEX	19940103	0.163
