The Effect of Demographic Dividend on CEO Compensation

Yi-Cheng Shih

Assistant Professor, Department of Finance and Cooperative Management, College of Business ,National Taipei University, Taipei, Taiwan

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Introduction

- During the global financial crisis, the issue of “fat cats” became a big matter, and after the crisis, it sheds light on the significance of reviewing the compensation packages of top executive (Lin et al. 2013).
- In this paper, we explore an new notion “demographic dividends “ and how it affects CEO compensation.
- Demographic dividends are hot issues of emerging markets in recent years. High demographic dividends suggest powerful spending capacity, and exploring emerging market with high dividends may bring in considerable potential revenue for the enterprises.

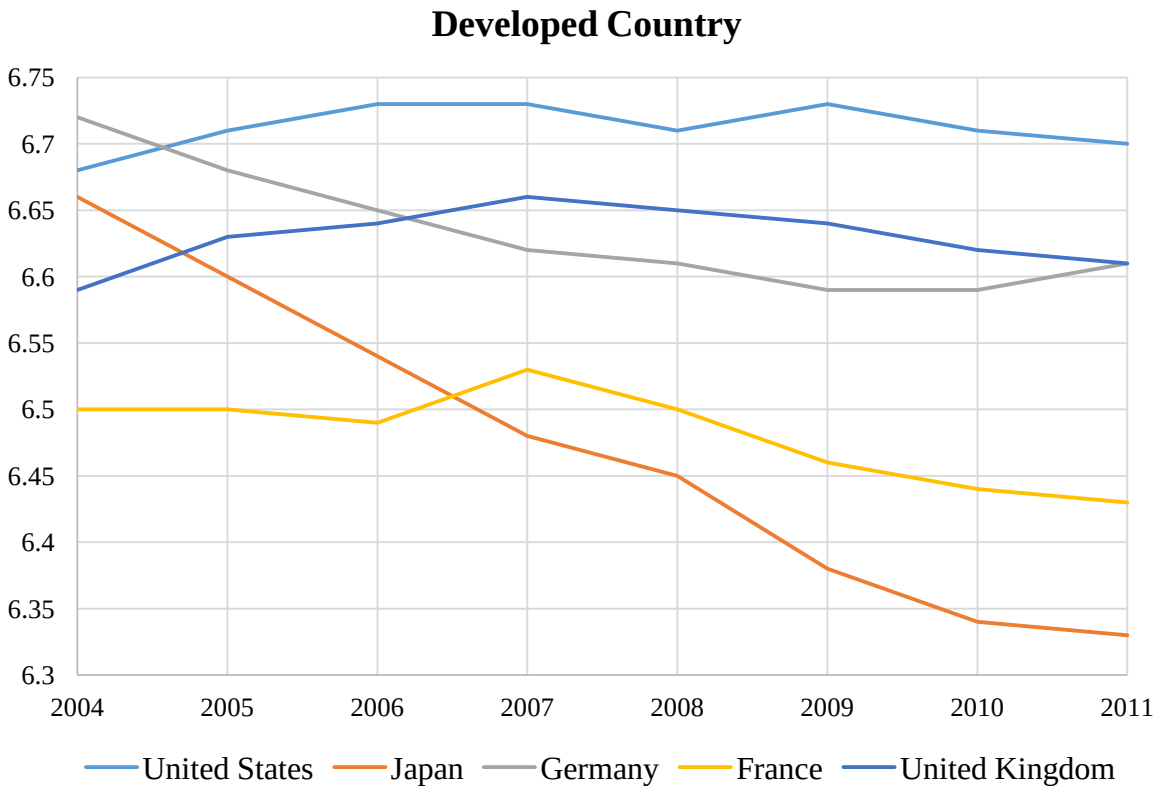
Introduction – Demographic Dividend

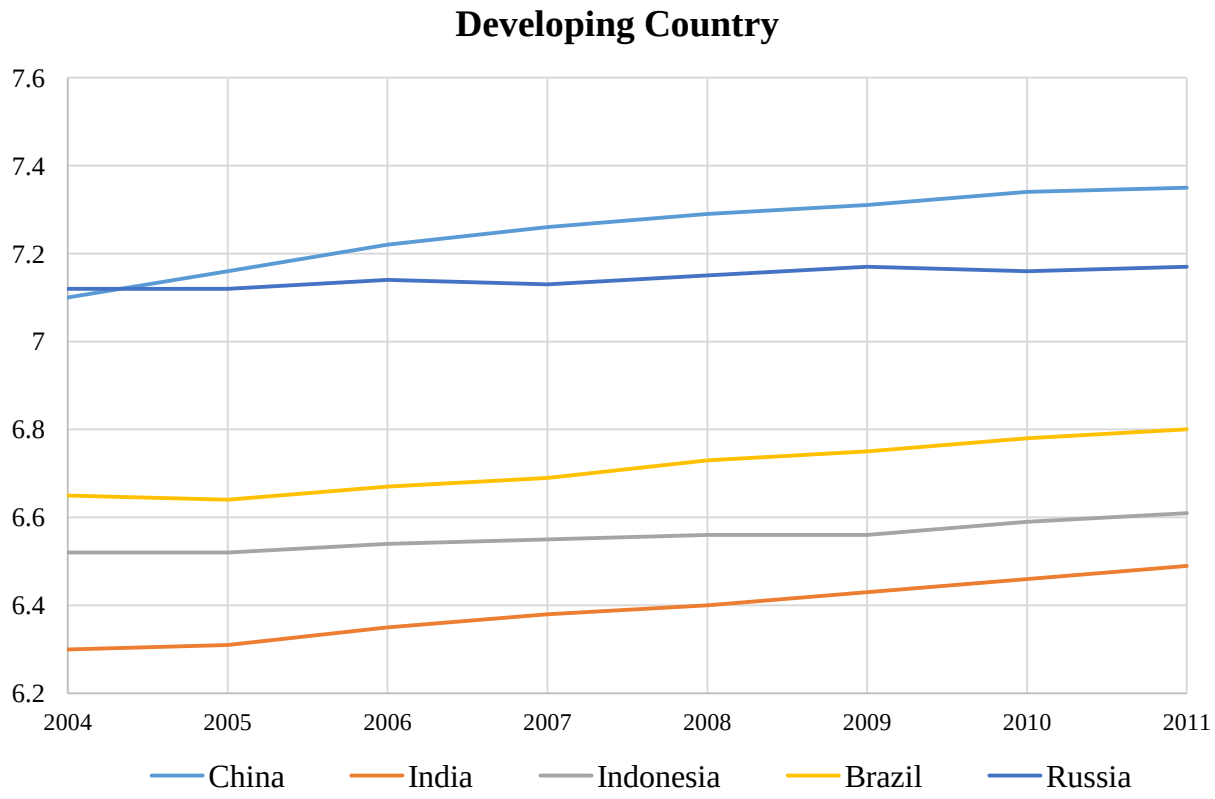
- *Jones (2012)* states that one key component of the demographic dividend is the rapid increase in the size of the working-age population; another is the relatively slow increase in the dependent groups – children and old people. Demographic dividends, the term “dividend” gives the sense of an inevitable benefit, and indeed the trend in dependency ratios is certainly inevitable in that it flows from the progression up the demographic pyramid of the cohorts born at different stages of the fertility transition.

- *Olaniyan, Soyibo et al. (2012)* point out that while most developed countries have largely completed their demographic transition, developing countries are still in the process.

	2011	2010	2009	2008	2007	2006	2005	2004
Developed Countries								
United States	67.0	67.1	67.3	67.1	67.3	67.3	67.1	66.8
Japan	63.3	63.4	63.8	64.5	64.8	65.4	66.0	66.6
Germany	66.1	65.9	65.9	66.1	66.2	66.5	66.8	67.2
France	64.3	64.4	64.6	65.0	65.3	64.9	65.0	65.0
United Kingdom	66.1	66.2	66.4	66.5	66.6	66.4	66.3	65.9
Developing Countries								
China	73.5	73.4	73.1	72.9	72.6	72.2	71.6	71.0
India	64.9	64.6	64.3	64.0	63.8	63.5	63.1	63.0
Indonesia	66.1	65.9	65.6	65.6	65.5	65.4	65.2	65.2
Brazil	68.0	67.8	67.5	67.3	66.9	66.7	66.4	66.5
Russia	71.7	71.6	71.7	71.5	71.3	71.4	71.2	71.2

- The demographic dividend of the top five populated developed countries and developing countries are shown separately above. The figure is shown in percentage form. The dividends in China, the largest populace in developing countries, are higher than 70% and still increasing, which is obviously higher than dividends in developed countries.

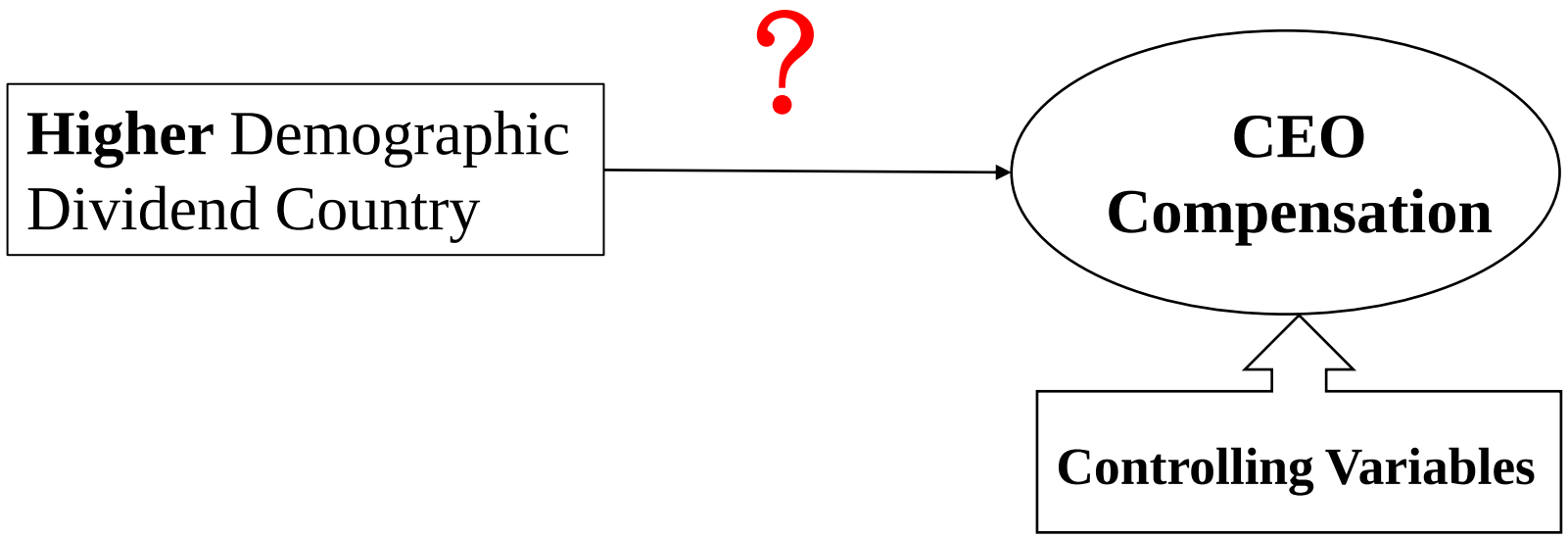




- In these recent years, developing countries are experiencing demographic dividends. The demographic dividends in developing countries are growing gradually in these sample years and generally declining in developed countries, especially Japan. The demographic dividend in Japan declines from 66.6% to 63.3% in 2004 to 2011.
- The phenomenon that developing Countries are undergoing the demographic transition is confirmed.

Introduction

- Higher scale of working people elevate the consumption ability and also lower cost of labor. With this, if a CEO puts more marketing emphasis on developing countries with high demographic dividend, the enterprise may have more potential revenue. As the result, the CEO is higher paid than average as reward.



Literature Review- Compensation Determinants

- CEO compensation is massively documented in previous studies, and the determinants of CEO compensation and their effect are diversified. Firm size, profitability, investment opportunities, international diversification, and also some CEO and BOD characteristics are positive factors to CEO compensation, while other determinants, such as industrial diversification, have negative relation with compensation.

Based on agency and expectancy theories, *Wang*, *Venezia et al. (2013)* show that higher **degree of international diversification**, and superior **accounting earnings performance**, **investment opportunities**, and **firm size** lead to more CEOs receive in compensation. In contrast, higher degree of industrial diversification result in less CEOs receive in total compensation.

Duru, *and Reeb (2002)* confirm the results in Gaver and Gaver (1995) on the significantly positive relation between **investment opportunity set** and incentive component of total compensation.

Exploring large UK firms, *Girma*, *Thompson et al. (2002)* have the conclusion that there was robust support for that CEO pay is positively related to the extent to which the firm's activities are located **outside its domestic environment**.

Ding, *Akhtar et al. (2006)* identify that the empirical investigation of 465 firms located in three major Chinese cities, Shanghai, Nanjing and Guangzhou, provides evidence that **organizational factors**, such as **ownership**, **firm size**, **firm age**, **location and industrial sector**, have significant impacts on the variances in Chinese managers' compensation levels, compensation structures and benefits.

With data of China's publically traded firms, *Conyon and He (2011)* find executive compensation is positively correlated to **firm performance**, but negatively correlated to **CEO turnover**. Besides, firms with more **independent directors** on the board have a higher pay-for-performance link.

With data from state-owned enterprises (SOEs) in China during the 1980s, *Mengistae and Xu (2004)* reveal that the sensitivity of CEO pay to firm performance decreases with the **variance of performance** and the performance sensitivity of CEO pay increases with **managerial control rights**, **worker incentives**, **profit retention rates of firms**, and the **degree of product market competition** faced by the firm.

Literature Review- Pay-for-Performance

- Executive compensation is positively correlated to firm performance. The result is an agreement with agency theory.

Branch, Farris et al. (2011) state that EV-Pay(Economic Value, Pay for Performance) provides a solid foundation on which to calibrate opinions about the equitable distribution of corporate earnings among owners and managers, and can help assure that the incentives for management are aligned with the objectives of investors.

- Most of previous studies focused on the relation between revenues and compensation without analyzing it further.

CEO pay has been examined empirically by Jensen and Murphy (1990a), Murphy (1985, 1986), Rosen (1990), Barro and Barro (1990), Joskow, Rose, and Shepard (1993), Crawford, Ezzell, and Miles (1993), Houston and James (1992), and Rose and Shepard (1994), all of whom find a positive relation between pay and performance for samples of publicly-held corporations. (*Hubbard and Palia 1995*)

Adopting data from China, *Conyon and He (2011)* identify a positive and notable link between executive pay and firm performance, and the empirical evidence in the study also suggests that the pay-for-performance relation is stronger in non-State controlled firms and in firms with a greater proportion of independent directors on the board.

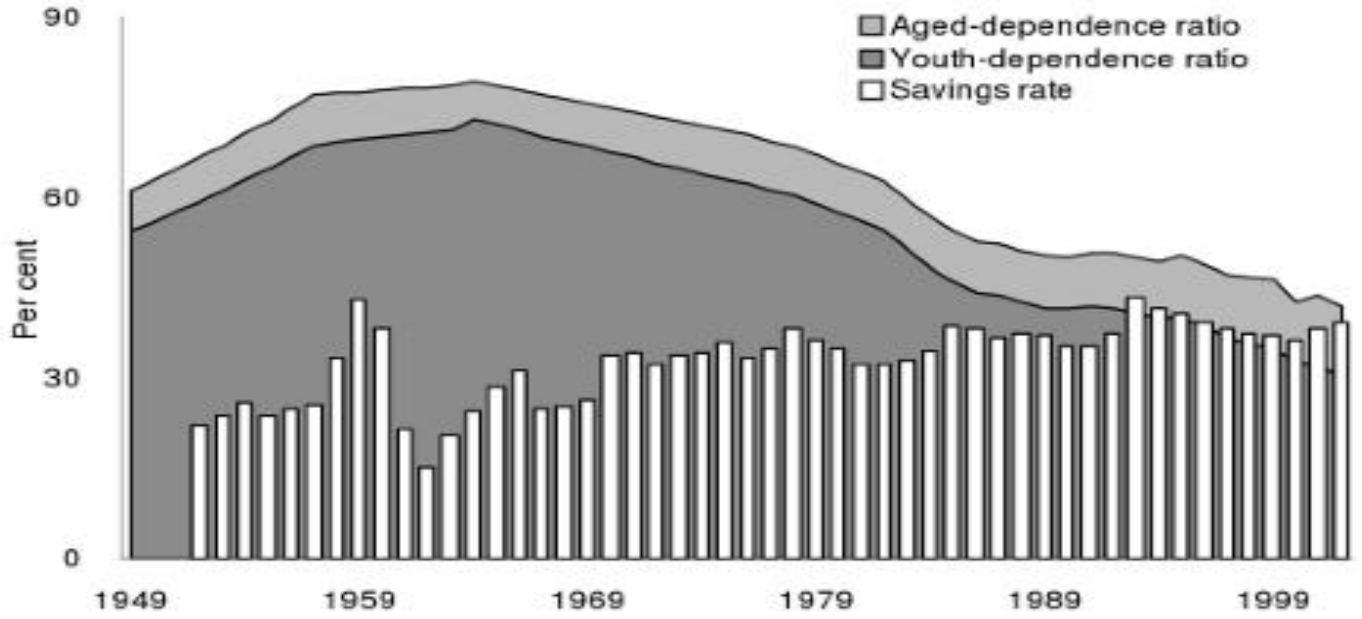
Kato and Long (2006) also show evidence that sales growth is linked to executive compensation in China's listed firms and that Chinese executives are penalized for making negative profits.

Literature Review- Demographic Dividends

Bloom, Canning et al. (2007) issue that nations with a high proportion of children are likely to devote a high proportion of resources to their care, which tends to depress the pace of economic growth. The effects are similar if a large share of resources is needed by a relatively less productive segment of the elderly. By contrast, if most of a nation's population falls within the working ages output per capita will be high all other factors being equal.

Positive relation between demographic dividend and economic growth in specific countries is also observed and showed in previous studies, especially developing countries, China (*Fang and Wang 2005*), South Africa (*Navaneetham and Dharmalingam 2012*), and Nigeria (*Olaniyan, Soyibo et al. 2012*).

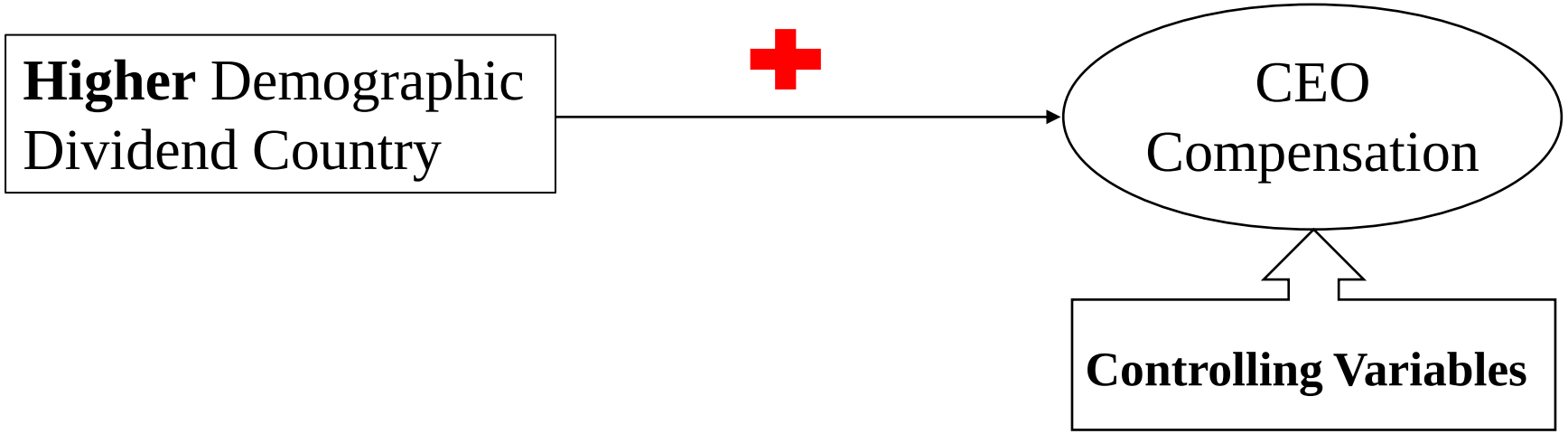
Figure 4.1 **Changes in the population dependence and savings rate**



Source: National Bureau of Statistics (NBS), various issues. *China Population Statistic Yearbook*, China Statistics Press, Beijing.

A high proportion of aged population and/or children increases the burden on society of dependents and reduces productive, therefore negatively affecting economic growth. Similarly, when the working population is relatively larger, the population structure is more productive because the **labor supply** and **savings rates** are larger. (*Fang and Wang 2005*)

Main purpose of this paper



- In the previous literatures, they mainly focused on the pay-for-performance effect, and in recent years, some bring up ideas about the positive effect between demographic dividend and economic growth. In this paper, **we firstly seek to link two concepts together and suppose that a CEO putting more weight on countries with high dividends will earn higher pay.**

Methodology

- Sample: Dow Jones Index 30 components

To control the size and the scale of sample companies, and to make sure the sales associated material is disclosed completely and available, we apply 30 companies included in Dow Jones Index.

- Sample Period: 2004~2011

The sample are 30 companies of Dow Jones Index that have a match in *North America* and in *Execucomp*, so we confine the period from 2004 to 2011 and to compare the effect before and after the financial crisis 2008.

We get the data of Dow Jones 30 from Compustat Annual Fundamental and ExecuComp database for the period 2004 -2011, firm-specific characteristics found in Compustat Annual Fundamental and CEO-specific characteristics, including its compensation, found in ExecuComp. The selection criteria yield total sample of **240 firm-year observations representing 35 firms**.

2011	AA	AXP	BA	BAC	CAT	CSCO	CVX	DD	DIS	GE	HD	HPQ	IBM	INTC	JNJ
	JPM	KO	MCD	MMM	MRK	MSFT	PFE	PG	T	TRV	KRFT	UTX	VZ	WMT	XOM
2010	AA	AXP	BA	BAC	CAT	CSCO	CVX	DD	DIS	GE	HD	HPQ	IBM	INTC	JNJ
	JPM	KO	MCD	MMM	MRK	MSFT	PFE	PG	T	TRV	KRFT	UTX	VZ	WMT	XOM
2009	AA	AXP	BA	BAC	CAT	**CSCO**	CVX	DD	DIS	GE	HD	HPQ	IBM	INTC	JNJ
	JPM	KO	MCD	MMM	MRK	MSFT	PFE	PG	T	**TRV**	KRFT	UTX	VZ	WMT	XOM
2008	AA	AXP	BA	**BAC**	CAT	C	**CVX**	DD	DIS	GE	HD	HPQ	IBM	INTC	JNJ
	JPM	KO	MCD	MMM	MRK	MSFT	PFE	PG	T	GM	**KRFT**	UTX	VZ	WMT	XOM
2007	AA	AXP	BA	HON	CAT	C	MO	DD	DIS	GE	HD	HPQ	IBM	INTC	JNJ
	JPM	KO	MCD	MMM	MRK	MSFT	PFE	PG	T	GM	AIG	UTX	VZ	WMT	XOM
2006	AA	AXP	BA	HON	CAT	C	MO	DD	DIS	GE	HD	HPQ	IBM	INTC	JNJ
	JPM	KO	MCD	MMM	MRK	MSFT	PFE	PG	T	GM	AIG	UTX	VZ	WMT	XOM
2005	AA	AXP	BA	HON	CAT	C	MO	DD	DIS	GE	HD	HPQ	IBM	INTC	JNJ
	JPM	KO	MCD	MMM	MRK	MSFT	PFE	PG	**T**	GM	AIG	UTX	VZ	WMT	XOM
2004	AA	AXP	BA	HON	CAT	C	MO	DD	DIS	GE	HD	HPQ	IBM	INTC	JNJ
	JPM	KO	MCD	MMM	MRK	MSFT	PFE	PG	SBC	GM	AIG	UTX	VZ	WMT	XOM

- In 2009, General Motors (GM) and Citigroup (C) were replaced by The Travelers Companies (TRV) and Cisco Systems (CSCO).
- In 2008, American International Group (AIG), Altria Group (MO) and Honeywell (HON) were replaced by Kraft Foods (KRFT), Chevron (CVX), and Bank of America (BAC).
- In 2005, SBC purchased former parent AT&T Corp. and took on its branding, with the merged entity naming itself AT&T Inc (T).

- Reasons to adopt Dow Jones 30

  – Issues of demographic dividends are first published in 2000s, so data of demographic dividends are still not ubiquitous.

  – Some geographic sales-information is not disclosed by countries but by regions, and the degree is divergent from one enterprise to another.

  – 30 enterprises in Dow Jones are with a long history; most of them are lasting more than 50 years, and some are even more than 100 years. And compared to S&P 500, although the average total assets of Dow Jones is 278billions lower than 556billions of S&P 500, the average sales in 2011 is 99billions four times higher than 20billions of S&P 500. With long history and large scale of sale strength, the enterprises in Dow Jones are completely developed and are prone to modify their sales strategies.

Definition of Variables (Cont.)

3. Measurement of firm-specific characteristic

Wang, Venezia et al. (2013) identify that when considering the determinants of CEO compensation, accounting-based measures of firm performance is greater reliance placed rather than market-based measures.

Wang, Venezia et al. (2013) state that Sales volume (Newman & Banister, 1998) and total assets (1996; Useng et. at., 2000) are two methods generally used to measure firm size.

The variables we adopt here are almost accounting-based except *EPS* which may be regarded as proxy of market capitalization. We control firm size with the natural logarithm of sales (*REV*) , risk exposure with debt/asset ratio (*LEV*), profitability with absolute value of *EPS* and *ROA*, and duration of the firm (*CO_AGE*).

Definition of Variables (Cont.)

4. Measurement of CEO characteristic

With previous literatures, we contain some control variables for CEO characteristic; two dummy variables, gender of current CEO (*GENDER*) and the independence from the board (*BOD*), which is recorded as 1 if the CEO serving as BOD member at the same time. Moreover, to control CEO experience, there are still two variables -current age of CEO (*CEO_AGE*) and tenure of becoming CEO (*TENURE*). It is especially needed to be mentioned that if there was any CEO replacement in one year, we admit the CEO who occupied longer in the targeted year. To supplement this deficiency, we add in a dummy variable that is marked as 1 if there was any CEO replacement (*REPLACE*) to identify if there was any substitution happening.

Regression Model

$$Compensation_t = \alpha + \beta_1\, demographic\ dividend + \beta_2\, firm - specific\ characteristic + \beta_3\, CEO\ characteritic$$

where t is sample years, 2004 to 2011

Measurement	Definition	Variable
Demographic Dividend	(Working Age Population / Total Population) × 10*	DIV
Firm-Specific Characteristic	Financial Structure; Total Debt / Total Assets	LEV
	Firm Size and Profitability; Total Revenue	REV
	Diluted Earning Per Share	EPS
	Profitability; Return on Assets = Net Income(Loss) / Total Assets	ROA
	Duration of the Firm	CO_AGE
CEO Characteristic	Dummy Variable - CEO Gender; 1 for male and 0 for female	GENDER
	CEO Experience - Current Age for Each Fiscal Year	CEO_AGE
	CEO Experience - Tenure; Targeted Year- the First Year Became CEO	TENURE
	CEO Independence from BOD; 1 for also serving as BOD	BOD
	1 denotes that there is CEO replacement in the targeted year	REPLACE

* Measurement of demographic dividend is elaborated more specific in former pages.

Result (I) – Regression

Variables	Firm-Specific Variables		CEO-Specific Variables		Total Variables	
	Coef.	t-statistics	Coef.	t-statistics	Coef.	t-statistics
DIV	0.8889	2.18 **	0.5466	1.31	0.8872	2.27 **
Firm Characteristics						
LEV	-0.3160	-0.89			-0.2677	-0.79
REV	0.2369	3.59 ***			0.2787	4.32 ***
EPS	0.0448	4.62 ***			0.0440	4.73 ***
ROA	-4.2550	-3.31 ***			-4.4520	-3.61 ***
CEO Characteristics						
CEO_AGE			0.0272	2.27 **	0.0395	3.43 ***
TENURE			0.0140	0.96	0.0069	0.51
REPLACE			-0.2567	-1.55	-0.2606	-1.72 *
Intercept	1.3640	0.47	4.2610	1.49	-1.3580	-0.47
Adjusted R-Square	0.131		0.052		0.203	
Number of Observations	240		240		240	

Summary (I)

- Demographic dividend is significant at 5% level in the regression only with firm-specific measurements and in one with complete measurements. And the R-square of model is also higher in these two regressions. As we predicted before, demographic dividend is positively significant that statistically proves our hypothesis.

- Pay-for-performance effect can be found obviously in our results that CEO compensation is significantly positive with revenue and EPS at 1% level.

- Age of CEO is significant positively with CEO compensation which is consistent with our intuition, older CEO with more experience, higher paid. Replacement of CEO is negative-correlated with CEO compensation at 10% significance.

Result (II) – Financial Crisis in 2007-2008

Variables	Firm-Specific Variables		CEO-Specific Variables		Total Variables	
	Coef.	t-statistics	Coef.	t-statistics	Coef.	t-statistics
Panel A: Pre-Financial Crisis 04-07						
DIV	1.0674	1.85 *	0.9614	1.60	1.2100	2.21 **
LEV	-0.1149	-0.19			0.0951	0.17
REV	0.3696	3.51 ***			0.4255	4.18 ***
EPS	0.0393	2.90 ***			0.0366	2.87 ***
ROA	-3.4620	-1.58			-2.7930	-1.35
CEO_AGE			0.0272	1.57	0.0488	2.91 ***
TENURE			0.0215	1.06	0.0030	0.16
REPLACE			-0.4142	-1.74 *	-0.4063	-1.90 *
Intercept	-1.3950	-0.35	1.5250	0.36	-5.8010	-1.43
Adjusted R-Square	0.156		0.080		0.254	
Number of Observations	120		120		120	
Panel B: Post-Financial Crisis 09-11						
DIV	2.6658	3.91 ***	0.1828	0.27	2.5480	3.80 ***
LEV	-1.5694	-3.29 ***			-1.5537	-3.28 ***
REV	0.0079	0.09			0.0446	0.51
EPS	0.2275	6.77 ***			0.2212	6.53 ***
ROA	-9.6040	-5.36 ***			-10.3290	-5.85 ***
CEO_AGE			0.0413	2.08 **	0.0245	1.42
TENURE			0.0061	0.25	0.0343	1.72 *
REPLACE			-0.0324	-0.12	-0.0218	-0.10
Intercept	-7.2810	-1.54	5.8840	1.28	-8.5910	-1.85 *
Adjusted R-Square	0.339		0.022		0.378	
Number of Observations	90		90		90	
Panel C: Financial Crisis Dummy						
DIV	1.1471	2.60 ***	0.6919	1.54	1.1855	2.84 ***
LEV	-0.4050	-1.01			-0.2942	-0.77
REV	0.2519	3.46 ***			0.3078	4.40 ***
EPS	0.0503	4.32 ***			0.0492	4.47 ***
ROA	-4.4740	-3.07 ***			-4.5960	-3.33 ***
CEO_AGE			0.0308	2.39 **	0.0443	3.61 ***
TENURE			0.0167	1.09	0.0099	0.70
REPLACE			-0.2707	-1.53	-0.3083	-1.91 *
Financial Crisis Dummy	-0.1380	-1.22	-0.0397	-0.35	-0.1861	-1.74 *
Intercept	-0.3950	-0.13	3.1040	1.01	-3.8430	-1.25
Adjusted R-Square	0.131		0.063		0.226	
Number of Observations	210		210		210	

Summary (II)

- We delete all data from 2008 and divide the rest data into two subsamples, in which 2004-2007 as pre-financial crisis and 2009-2011 as post-financial crisis.

- Demographic dividend is positively significant at 1% level after the financial crisis and only at 5% level before it and the R-square of full model is higher in the post-financial crisis model. We can identify that demographic dividend has more powerful effect on CEO compensation after the financial crisis.

- Revenue is positively significant at 1% level before the financial crisis and insignificant after that while leverage has negative influence on CEO compensation after the crisis and insignificant before it.

Panel Analysis

Variables	OLS		Panel (Fixed Effect)		Panel (Random Effect)	
	Coef.	t-statistics	Coef.	t-statistics	Coef.	t-statistics
DIV	0.8872	2.27 **	0.7402	1.43	0.8473	1.82 *
Firm Characteristics						
LEV	-0.2677	-0.79	0.8727	1.94 *	0.5419	1.40
REV	0.2787	4.32 ***	-0.1511	-1.29	0.0500	0.55
EPS	0.0440	4.73 ***	0.0059	0.59	0.0168	1.85 *
ROA	-4.4520	-3.61 ***	2.4578	1.66 *	0.4752	0.35
CEO Characteristics						
CEO_AGE	0.0395	3.43 ***	0.0145	1.13	0.0192	1.59
TENURE	0.0069	0.51	0.0176	1.28	0.0165	1.26
REPLACE	-0.2606	-1.72 *	-0.3044	-2.70 ***	-0.3061	-2.63 ***
Intercept	-1.3580	-0.47	4.6073	1.20	1.7438	0.51
Adjusted R-Square	0.203		0.253		0.592	
Number of Observations	240		240		240	

- With our panel data composed of time series data and cross-sectional data, we apply the panel regression to check the results if OLS is not sufficient.

- Considering features of our data, we put more emphasis on the random effect in panel analysis, rather than fixed effect.

- It is significantly positive at 5% and 10% level when under OLS and panel analysis respectively and this identifies our hypothesis again that CEO who put more emphasis on the market with higher demographic dividend will get higher pay.

Conclusions

- With the previous literatures about pay-for-performance effect and the new notion, demographic dividend, brought up in recent years, we firstly attempt to link two concepts together and suppose that a CEO putting more weight on countries with high dividends will earn higher pay.

- High demographic dividends suggest powerful spending capacity, and exploring emerging market with high dividends may bring in considerable potential revenue for enterprises. Therefore, the CEO get higher pay if he can put more emphasis on developing countries with high dividends. Moreover, demographic dividend has more powerful effect on CEO compensation after the financial crisis.

- Demographic dividend has ***positive*** relation with CEO compensation only in the service industry subsample, especially the general service industry excluding finance and insurance.

➡ The contribution of this paper is that we provide evidences when CEOs of firms decide business policies, they should consider demographic dividends issues to improve performance and also their compensation.

Conclusion Cont.

- There are two limitations which can be improved in the future. Firstly, because this paper is the first attempt to combine the demographic dividend with CEO compensation, the data are not disclosed in detail that we can only compute the proxy in some cases. Another one is the difficulty in processing data, we only adopt Dow Jones 30 as our data base and if we can apply more sample in the future, our results may be more robust.

Thanks for your attention!!!