Impact of the Asian Financial Crisis on East Asia: Institutional Change or Transformation? Evidence from Panel Data Analysis

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Abstract

Theory on institutions maintains exogenous shock such as financial crisis as critical for institutional change. At the same time, the theory also suggests its path dependency and persistence. Although voluminous literature has been published on the relationship between institutional quality and development, they suggest little about how financial crisis affects institutions in practice. This research fills this gap by examining the impact Asian Financial Crisis 1997-98 had on East Asia's institutional quality and its impact on economic development. Through panel data analysis from 1981-2007, we investigate whether the crisis transformed East Asia's pre-existing mode of governance – relational governance – towards rule-based governance found in advanced western countries. Our findings show that while reforms after the crisis brought improvements – institutional change towards rule-based governance – the effects did not sustain to bring transformation. Our research also shows that international environment such as bipolar structure during Cold War matters for East Asia's relational governance, and that reforms lasted longer for states with IMF intervention than other East Asian states.

Keywords Relational Governance, Institutional Change, East Asia, Economic Development, Financial Crisis

Introduction

How do institutions change? While institutions are path dependent and persistent, theory on institutions identifies exogenous shocks such as financial crisis as critical for institutional change through opening a critical juncture (North, 1990). Yet, existing research examining relationship between institution and development suggests little about how such theory works empirically. On the one side, voluminous literature has examined effects of institutional quality on economic development (Daron Acemoglu, Johnson, & Robinson, 2000, 2005; Kaufmann, Kraay, & Mastruzzi, 2009; Kurtz & Schrank, 2007; Rodrik, Subramanian, & Trebbi, 2004). These literature, however, do not address effects of exogenous shock such as financial crisis. Recently, another strand of research has come up with theoretical mechanisms of how institutions change through trade pattern and demand for finance. Do and Levchenko (2004) show that countries with higher demand for external finance than countries with less demand have incentive to improve institutional quality. Similarly, Levchenko (2013) and Nunn (2007a, 2007b) introduce an empirical model for how trade pattern can shapes domestic institutions. Yet, despite these efforts, no research has empirically tested how exogenous shocks such as financial crisis shape domestic institutions.

This research fills the gap in existing literature by focusing on East Asia, which serves as a perfect laboratory to conduct our research for several reasons. Not only did East Asia suffer from a devastating Financial Crisis 1997-98, but voluminous literature under various typologies – East Asian Miracle, Asian Developmental States, Asian Growth Paradox, and East Asian Tigers – suggests East Asia achieved tremendous growth despite lacking good governance such as effective rule of law (Kohli, 2004; Li, 2003; M. G. Quibria, 2014; Wade, 1994; White & Wade, 1988). Li (2003); Rajan and Zingales (1998) expand these findings and identify East Asia's mode of governance as relational governance, a fundamentally different governance compared to rule-based governance employed by advanced western countries. In this context, East Asia allows us to test whether institutional transformation – changing from relational governance to rule-based governance – has taken place, opposed to institutional change – change in degree of initial governance.

Employing panel data analysis from 1981 to 2007, this research examines whether Asian Financial Crisis 1997-98 transformed East Asia's reliance on relational governance for economic development to rule-based governance. Specifically, two questions summarize this research: *How does institutional quality affect economic development in East Asia? And how has that relationship changed after the Asian Financial Crisis?* Since East Asian countries differ in severity of the crisis, we employ two different groups to differentiate their effects. First group consists of countries of East Asian Miracle states – South Korea, Thailand, Indonesia, Philippines, Malaysia, Singapore.[1] Second group consists of three

[1] Although Hong Kong and Taiwan also belong to this group, we leave them out as we could not obtain their data

countries most severely affected by the crisis and resorted to the IMF intervention – South Korea, Indonesia, and Thailand. We expect these countries to transform their institutions not only because of severity of the crisis, but also because IMF requires structural changes for countries borrowing their funds.

Our analysis shows that while the Asian Financial Crisis caused institutional reform for both East Asian groups, its effect was not strong enough to transform relational governance to rule-based governance. Our analysis shows that immediately after the crisis, institutional quality improves for both groups, due to the reforms in corporate governance and financial system. However, the effects do not sustain, as marginal effects reach zero after 4~5 years, suggesting that the legacy of relational governance remains in practice despite improvements made in institutional quality. In sum, our findings show ambivalent result that institutions are persistent and at the same time, susceptible to exogenous shocks. Another finding is that reforms lasted longer for three East Asian countries that in exchange for receiving IMF bailout, agreed to IMF structural changes, suggesting partial success for IMF intervention.

Overall, this research makes several contributions to existing literature. First, despite much research on East Asia, not much research has empirically examined whether institutional transformation took place after the financial crisis in East Asia. Second, no research in our knowledge has tested effects of international norms such as the period of Cold War that some scholars (Cummings, 1999) claim has allowed East Asia to maintain its status as a developmental state without needing to reform towards rule-based governance. In addition, we also test diffusion theory which suggests that countries adopt constitutional review

Finally, although existing literature generally agree that varieties of institutional models exist in paths for growth (D Acemoglu, North, Rodrik, & Fukuyama, 2008; Haggard, 2004; Rodrik, 2008), not much research has examined whether different institutional models would eventually converge towards mode of good governance advanced Western countries employ, or remain divergent. Scholars such as Dixit (2009) claims that as societies become more complex through technological change and population growth, countries would eventually need to resort to rule-based governance to deal with high transaction costs that relational governance may have limitations. In this context, this research offers an empirical test for such claim.

2. **Literature Review**

A. Institutional Features of East Asia

East Asian Miracle refers to rapid economic growth from 1960s to 1990s by eight East Asian economies – Hong Kong, Indonesia, Japan, Malaysia, South Korea, Singapore, Taiwan, and Thailand (Birdsall, Ross, & Sabot, 1995). Although these state lacked good governance – strong rule of law and low level of corruption – the government played an important role accumulating high level of physical and human capital critical to growth (Birdsall et al., 1995; Kohli, 2004; Wade, 1994). If good governance meant minimizing

government interference to achieve economic development by preserving market and attracting investment, then East Asian Miracle meant the opposite. Voluminous literature under different typologies – East Asian Paradox (M. Quibria, 2006; M. G. Quibria, 2002; Rock & Bonnett, 2004; Rodrik, 1997; Rothstein, 2015), Cohesive-capital state (Kohli, 2004), and Developmental state (Beeson, 2009, 2014; Cummings, 1999; Wade, 1994; White & Wade, 1988) – has examined dynamics of East Asian governance. Haggard (2004) provides varieties of institutional models that put East Asia's mode of governance in perspective.

FIGURE 1
Institutional Models of Capital Accumulation

Property Rights I	Strong property rights → investment → growth
Property Rights II	Political stability → certainty over property rights → investment → growth
Regime Type I	Authoritarian regime → direct mobilization of resources and pro-investment policies → investment → growth
Regime Type IIa	Authoritarian regime → stable macroeconomic policy → investment → growth
Regime Type IIb	Authoritarian regime → policy reforms that improve allocative efficiency → investment and increased productivity → growth
Credible commitments I: Representative institutions	Business-government networks and/or counsels limit predation and solve credible commitment problems → investment → growth
Credible commitments II: Delegative institutions	Delegation and "Weberian" bureaucracies limit predation, solve credible commitment problems, and improve the quality of policy → investment → growth

** **Source: Haggard (2004, p. 57)**

Haggard (2004) shows that active presence of government replaced functions of rule of law in East Asia. Specifically, Haggard illustrates government secured credible commitments through both effective bureaucracies and government-business networks. Effective bureaucracies have been elaborated by Evans and Rauch, whose research shows that "Weberian" Bureaucracies – merit based recruitment, predictable salary and relatively corruption-free bureaucracies – played an important role for East Asian Tigers – South Korea, Hong Kong, Singapore, and Taiwan – in achieving rapid economic growth (Evans & Rauch, 1999). Through high quality bureaucrats, these countries were able to establish effective industrial policies such as handling complex stewardship of exchange rate management to keep Korean exporters competitive in international market (Nam, 1995). This was especially important in Korean context, since Korea had higher inflation rate than its trading partners. Similarly, Wade (1994) and White and Wade (1988) show that state intervention contributed to generating comparative advantage by choosing which technologies and products to specialize and invest to export. Rodrik (1995) also credits state intervention through subsidies and coordination efforts in Taiwan and South Korea as key factor for overcoming shortage of skilled labor and physical capital.

East Asian governments also established credible commitment through business-government networks and/or counsels. Through such counsel, East Asian states limited

predation and solved credible commitment problem. Kim, Dal Shim, and Kim (1995) accounts that in South Korea, the president chaired "monthly export promotion expansion meetings" where the government consulted with the export industries and monitored their performance. Members of this counsel included Ministers with trade relevant duties and banking, shipping companies, and representatives from exporting firms. Together, they would review performance and address emerging problems. Through this meeting, South Korea established a consensus building process that effectively systematized export-oriented policies. Similarly, Kohli (2004) labels Korea's developmental experience "Cohesive capitalism," as cohesion of authority existed among business and government elites that promoted economic policies, but also brought systematic control of lower classes and civil society through brutal repression.

Some scholars suggest that rule of law exists in East Asia, but serves different functions. legal institutions in East Asia, including property rights, serves to expand state elite's power, which contrasts from the commonly held view that legal institutions serve to constrain state's political power. To borrow Moore's words, 'revolution from above' rather than 'revolution from below' characterize East Asia's rule of law. Similarly, another approach for understanding East Asian rule of law comes from the notion of a 'dual state,' which means a separation between economic sphere governed by law and executive power unconstrained by law (Jayasuriya, 2006). Under this framework, institutions and law are viewed as structures provided by the state rather than forms accepted by the state, or established by works of political actors. Therefore, it is not surprising to find that its legal rationality is disconnected from civil society and serve as instruments of state power. Overall, the fundamentals underlying their concept of rule of law seems similar to the models expounded earlier in this section about active government interventions, as both types center on top to bottom approach.

B. Relational Governance and Asian Financial Crisis 1997-98

Although active government intervention described in the previous section played an instrumental role achieving rapid growth, much of existing literature trace the cause of the Asian Financial Crisis 1997-98 to this mode of governance that scholars identify as relational governance (Dixit, 2009; Li, 2003; Rajan & Zingales, 1998). Krugman (1999) claims that government guarantees of financial intermediaries characterized by excessive risk-taking played an important role causing the crisis. Similarly, Pempel and Tsunekawa (2015) claim that the close government-business relations made them vulnerable to fast-moving and highly sophisticated global capital movement in 1997-98. Simply, neither the governments nor the financial institutions in East Asia were adequately prepared to handle "sophistical financial instruments (Pempel & Tsunekawa, 2015)." Subsequently, Rajan and Zingales (1998) explain that relationship-based systems function well with scarce capital and poor contracting environment, but is highly susceptible to mismanaging capital when large external capital flows in, because relation-based system relies on manipulating and suppressing pricing signal.

Scholars generally agree that East Asian states as a collective region improved their financial system and corporate governance after Asian Financial Crisis. especially among the most severely suffered states –South Korea, Thailand, and Indonesia (Pempel & Tsunekawa,

2015). On the side of financial regulation, South Korea established a new financial supervisory body, the Financial Supervisory Commission (FSC), to oversee the entire financial sector. As Hamilton-Hart (2008) notes, this marks an official step towards a more consolidated system of financial supervision. The government also nationalized insolvent banks, and made them available for foreign investor's purchase, allowing foreign investor to own majority stake of the bank. Despite these efforts, Hamilton-Hart (2008) question whether these institutional reforms actually are practiced, opposed to just an established design. For example, although reforms allowed foreign firms to own Korean companies and banks, the government quickly used public funds to purchase Korean banks. When Lonestar, a foreign investment firm tried to own majority ownership, the Korean government objected, as the public opposition mounted. Overall, scholars appear mixed in assessing impact of the reform.

3. Empirical Model

The empirical model that best resembles our model is by Rodrik et al. (2004), who tests institutional effects on economic growth by incorporating other determinants from theories of growth – trade from the market-integration theory and determinants from endogenous growth theory and geography. Our research incorporates determinants from other theories related to economic growth. While our model excludes geography, we replace it with determinants from endogenous growth theory – human and physical capitals and technology. Through incorporating other determinants of growth, our intention is to test for robust effects of institutional quality. To further test for robustness, we apply effects of international norms on institutional quality and developmental states that existing theories have suggested (Cummings, 1999; Ginsburg & Versteeg, 2014). For example, Cummings (1999) claims East Asian developmental states survived and maintained its status because of Cold War, a period in which the United Sates and the Soviet Union competed to attract allies. Similar argument has been made by Wade (1990), who argues that international environment provided East Asian states with opportunities to rapidly grow. We also incorporate arguments by Ginsburg and Versteeg (2014), who claim global norms affect countries from adopting constitutional review, as they strive to gain legitimacy in international community and want to attract foreign investment. In accordance with these literature, our model controls effects of international norms to better measure effects of institutional quality on income.

In terms of data, our model spans from 1981 to 2007. Although more years of observations were available beyond 2007, we intentionally restricted the data in effort to minimize effects of global financial crisis that started from 2008. In total, we have more than 3,000 observations with more than 130 countries. In the next section we elaborate on the determinants from theories relevant to growth.

4. Theoretical Framework & Measurements

(1). Determinants of Institutional, Endogenous Growth, and Market Integration Theories

Theories on institutional quality and good governance have particularly emphasized the importance of rule of law and property rights for economic development (Daron Acemoglu et al., 2005; D Acemoglu et al., 2008; Kaufmann et al., 2009; North, 1990). Therefore, we use judicial independence to measure institutional quality. Judicial

independence refers to the autonomy of judiciary in a state, such as the power of the court to make decisions independent from political agencies or organizations. Existing indexes use several concepts to measure such independence. Typically, it is measured by whether judges are appointed for life or by terms. Other measures include insulation of salaries and difficulty of impeachment. Difficulty of impeachment measures number of agencies involved to remove a judge. The higher the number, the more difficult, thereby providing greater autonomy.

Existing datasets measure these concepts by *de jure*, or *de facto*. De jure scores the index based on constitution's written intent of autonomy, whereas de facto is based on autonomy of judiciary by practice. In recent research, Melton and Ginsburg (2014) empirically show that significant discrepancy may exist between scores of de jure and de facto. The gap arises because although constitutionally autonomous, political maneuvers or legislation that reduce their autonomy may exist. Because we want to measure the actual effect, rather than the intent, we use de facto measure of judicial independence.

To represent growth theory (Romer, 1990; Solow, 1970), which encompasses physical and human capital, and technological advancement in our model, we add following variables: population between 16-64 years old, gross capital formation, and real GDP. Population between 16-64 represents measure of potential labor force. We use potential labor force rather than actual labor force, because it has more observations for developing countries, as using population aged from 15-64 allowed us with more than 1,000 observations. To measure level of technology, we use real GDP. Although existing literature use income as a proxy (Levchenko, 2007, 2013), since income is used for dependent variable, we use real GDP instead. To measure effects of trade from market integration theory, we use share of trade as percent of GDP. This variable does not distinguish between exports and imports, as it represents accumulation of the two. Much of existing literature, including Rodrik et al. (2004) that we build on, use this index to measure trade openness and dependence on trade. As aforementioned, we include these determinants not to gauge which determinant matters the most, but used rather as an instrument for testing robustness for effects of institutional quality.

For the control variables, we include general government consumption that affects economic performance, and energy imports, as extensive literature mention level of energy imports affect institutional quality (Kolstad, 2009; Mehlum, Moene, & Torvik, 2006; Ross, 2012) . In the next section we elaborate on our main explanatory variable, institutional quality (rule-based governance).

(2). Main Explanatory Variable: Judicial Independence de facto (Rule-based Governance)

To measure judicial independence de facto, we use index by Linzer and Staton (2015). We specifically use this measure because it is one of few measures of rule of law available before Asian Financial Crisis 1997-98, and has longest years of observation.

Other datasets, ICRG dataset by PRS group, is not publicly available, and Economic Freedom dataset (James Gwartney, 2016), only offers years of observation in five year increment before the crisis. The index developed by Linzer and Staton (2015) captures de facto judicial independence, or how judicial independence is actually practiced and implemented, opposed to de jure judicial independence measuring institutional design. To derive its measurement, Linzer and Staton (2015) captures common base of other measures of institutional quality by Feld and Voigt (2003), Howard and Carey (2003), Economic Freedom dataset by James Gwartney (2016), Human Rights Database by Cingranelli and Richards (2010), Polity IV Project by Marshall, Jaggers, and Gurr (2011), and ICRG dataset from PRS group. Conceptually, Linzer and Staton (2015) claim the index broadly measures autonomy and also the power of the court.

(3). Dependent Variable: Income

As most existing literatures have done, we use GDP per capita, or income, and change in income, or income growth to represent dependent variable, economic performance. We use both income and change in income as dependent variables because our main explanatory variable, judicial independence, is a perception-based indicator with small time variation but large variation across countries. Therefore, to better capture its relationship with income, we employ both income and change of income.

(4). East Asian Country Groups

Since we want to examine the effect of the crisis on East Asian countries, we use two types of country dummy variable consisting of East Asian states most severely affected by the crisis, or IMF intervened states – South Korea, Indonesia, and Thailand. Second group consists of six East Asian Miracle states – South Korea, Indonesia, Thailand, Philippines, Malaysia, and Singapore. Although the miracle states also include Taiwan and Hong Kong, we excluded the two members due to unavailability of data. Although some literature suggests both China and Japan as members of the Miracle States, much of existing literature define members as achieving tremendous growth during 60s and late 80s, which would exclude China. Japan is also excluded because much literature suggests Japan achieved its growth a generation before rest of the member states, and also it has relatively suffered less from the crisis.

(5). Time Dummy Variables

To measure East Asia's variation during different periods, we create a time dummy variable labeled "After," which indicates years after the crisis – from 1999 to 2007. In addition, to control for the effects of international norm during the Cold War, we include time dummy variable labeled "DuringColdWar" for years from 1981 to 1990. Finally, to measure lasting effects of reform, we add periods of years after the crisis; years from 1999-2001, 1999-2002, 1999-2003, 1999-2004, and 1999-2005. For more information on all variables and their sources, please refer to the appendix.

5. Model Specification

To investigate East Asia's institutional effects on economic performance, we analyze panel data using Fixed Effects with cluster option for countries. The base model is as follows:

$$Income = {}_{\beta}0 + \beta 1_{JI} + \beta 2_{Trade} + \beta 3_{Labor} + \beta 4_{Technology} + \beta_{5GrossCapital} + X \cdot \gamma + \varepsilon \quad (1)$$

Where $\beta 1$ is our main explanatory variable, Judicial Independence de facto, and $\beta 2$ *and* $\beta 3$ determinants from respective theories. Market integration is measured by trade, whereas determinants of potential labor force, gross physical capital, and real GDP are used as measures for human capital, physical capital, and technology. $X \cdot \gamma$ includes relevant control variables that affect economic development, such as government's general final consumption and energy imports. To compare effects of the crisis on different East Asian groups, we include multiple interaction variables, since fixed effects do not allow us to include time invariant factors but estimation of time-invariant factors is possible when interacting with time-variant factors.

$$Income = \beta 0 + \beta 2_{Trade} + \beta 3_{Labor} + \beta 4_{Technology} + \beta 5_{GrossCapital} + \beta 1_{JI} * G_{EA} * Year_{After\ Crisis} + X \cdot \gamma + \varepsilon \quad (2)$$

Where G_{EA} represents time invariant country group variable for East Asian Miracle states and IMF intervened states. $Year_{After\ Crisis}$ represents years after Asian Financial Crisis –from 1999 to 2007.

Finally, if we want to control for international norm in certain periods such as the years during the Cold War, we simply add an additional time dummy variable.

$$Income = \beta 0 + \beta 2_{Trade} + \beta 3_{Labor} + \beta 4_{Technology} + \beta 5_{GrossCapital} + \beta 1_{JI} * G_{EA} * Year_{After\ Crisis} + \beta 6_{duringcoldwar} + X \cdot \gamma + \varepsilon \quad (3)$$

Where $\beta 6_{duringcoldwar}$ represents years before the Cold War ended, or the Soviet Union collapsed, from 1981 to 1990.

6. Empirical Analysis

A. East Asian Miracle States

We start our analysis by first showing pooled OLS results in which we averaged variables from period of 1981-2007. Columns 1 & 2 we use income as a dependent variable, whereas in column 3 and 4, we use change in income – growth in income from previous year. Both income and change in income are used to better measure the relationship between judicial independence and income. Unlike other independent variables – Physical capital (grosscap), trade (trade openness), and potential labor force – judicial independence is a perception-based measure with smaller time variation compared to other measures. Therefore, to better capture its dynamic, we employ both income and income change.

Table1. Cross-section regression using 26-year average (1981-2007) for both income and income%

VARIABLES	(1) Income	(2) Income	(3) Income%	(4) Income%
Gov. Cons.	0.0263*	0.0273*	0.0126	0.0182

	(0.0143)	(0.0149)	(0.0363)	(0.0367)
Energy Imports	-0.00221***	-0.00221***	0.00242**	0.00238**
	(0.000486)	(0.000490)	(0.00102)	(0.00103)
Gross Capital	-0.0300**	-0.0312**	0.147***	0.140***
	(0.0150)	(0.0156)	(0.0500)	(0.0516)
Trade	0.00358**	0.00346**	4.30e-05	-0.000634
	(0.00144)	(0.00140)	(0.00321)	(0.00350)
Real GDP	0***	0***	-0	-0
	(0)	(0)	(0)	(0)
Potent Labor	0.108***	0.108***	0.0986	0.0982
	(0.0145)	(0.0146)	(0.0631)	(0.0633)
Miracle6		0.0275		-0.200
		(0.899)		(1.586)
JI	2.415***	2.421***	-0.477	-0.448
	(0.269)	(0.272)	(1.185)	(1.212)
Miracle6*JI		0.224		2.021
		(2.105)		(3.208)
Constant	-0.135	-0.119	-7.214**	-7.121**
	(0.691)	(0.698)	(3.180)	(3.227)
Observations	130	130	130	130
R-squared	0.784	0.784	0.250	0.253

The column 1 and 3 are general models for income and income change, whereas column 2 and 4 include group dummy for East Asian Miracle states and their interaction with judicial independence (JI). Column 1 and 2 are statistically significant, and the interaction variable of Miracle8 in column 2 is not, indicating that effect of judicial independence on East Asia does not differ from of rest of the samples, in which judicial independence has a positive and statistically significant effect on income.

One issue we need to address from the analysis above is controlling for yearly effects This is important, because of international norms that may substitute and replace explanation for growth. Reviewing existing literature, we find supporting arguments for both judicial independence and income that may affect East Asia. Cummings (1999) claim that international norms play an important role for sustaining developmental states in East Asia, as the United States wanted to maintain its allies during the Cold War, and provided necessary support and looked other way despite principles of democracy or liberalization not consistent with the United States. Subsequently, Ginsburg and Versteeg (2014) explains why countries adopt constitutional review based on international norm, so-called diffusion theory. Although there are wide range of diffusion mechanisms, one of the more relevant explanation is that states adopt constitutional review as a strategy to attract foreign investments and trading partners (Goderis & Versteeg, 2012). These studies show relevance of international norms for our research, and we now test these claims by controlling for certain time periods. To do so, we now use panel data analysis since we cannot control for time in pooled OLS. In the regression model below, we applied time control to the same model previously analyzed but without group dummy variable.

In model 2, or column 2, we have added a time dummy variable ‘DuringColdWar’ to control for effects of international norms that may have affected judicial independence and income.

Upon adding the time variable, judicial independence loses its significance, and although we do not show the results here, we have also analyzed effects of controlling time effects for every year from 1981 to 2007. Here we also find a similar result of judicial independence losing it statistical significance. On the contrary, other explanatory variables – potential labor force and gross capital – we find them statistically significant regardless of the model.

Table2. Panel Regression controlling periods during Cold War

VARIABLES	(1) Income	(2) Income	(3) Income%	(4) Income%
JI	0.749***	0.444	-0.514	-1.320
	(0.258)	(0.280)	(2.332)	(2.305)
Gov. Con	0.00127	0.00128	-0.297***	-0.296***
	(0.00597)	(0.00584)	(0.0702)	(0.0707)
Energy Import	-0.000351	-0.000209	-0.00402	-0.00366
	(0.000289)	(0.000287)	(0.00297)	(0.00303)
Gross Capital	0.0109***	0.0129***	0.116**	0.121***
	(0.00360)	(0.00365)	(0.0457)	(0.0452)
Trade	0.000975	0.000163	0.0284**	0.0262**
	(0.00126)	(0.00113)	(0.0133)	(0.0131)
Real GDP	0**	0*	-0	-0**
	(0)	(0)	(0)	(0)
Potent Labor	0.0855***	0.0632***	0.410***	0.350***
	(0.0109)	(0.0105)	(0.0953)	(0.0846)
During Cold War		-0.270***	0.722*	
		(0.0506)	(0.379)	
Constant	1.881***	3.531***	-23.35***	-18.91***
	(0.683)	(0.677)	(5.604)	(4.782)
Observations	3,013	3,013	2,970	2,970
R-squared	0.393	0.438	0.112	0.109
Number of country	130	130	130	130

Despite these results, however, we cannot still conclude that the same applies in East Asian context. Therefore, building on these general models, we now test how East Asia, specifically the East Asian Miracle states, fit under these models. The results are below.

Table3. Panel Regression with East Asian Miracle States (Miracle6)

VARIABLES	(1) Income	(2) Income	(3) Income Change	(4) Income Change
Gov. Cons.	0.00109	0.00107	-0.290***	-0.291***
	(0.00593)	(0.00580)	(0.0709)	(0.0703)
Energy Imports	-0.000349	-0.000207	-0.00371	-0.00407
	(0.000289)	(0.000286)	(0.00305)	(0.00299)
Gross Capital	0.0109***	0.0129***	0.121***	0.115**

	(0.00359)	(0.00364)	(0.0452)	(0.0457)
Trade	0.000984	0.000172	0.0259*	0.0282**
	(0.00126)	(0.00113)	(0.0132)	(0.0134)
Real GDP	0**	0*	-0**	-0
	(0)	(0)	(0)	(0)
Potent Labor	0.0850***	0.0625***	0.363***	0.425***
	(0.0110)	(0.0106)	(0.0843)	(0.0950)
During Cold War		-0.270***		0.737*
		(0.0507)		(0.379)
JI	0.718**	0.404	-0.429	0.414
	(0.277)	(0.300)	(2.324)	(2.366)
Miracle6*JI	0.374	0.462	-10.41*	-10.65*
	(0.714)	(0.687)	(6.168)	(6.201)
Constant	1.918***	3.581***	-19.99***	-24.54***
	(0.697)	(0.690)	(4.734)	(5.573)
Observations	3,013	3,013	2,970	2,970
R-squared	0.393	0.439	0.112	0.114
Number of country	130	130	130	130

Both column 1 and 2 regress on income, with column 1 without time effects of the Cold War, and column 2 with time effects of the Cold War. Similar to previous analysis, we lose significance of judicial independence when controlling 'During Cold War' variable. When analyzing against income change in column 3 and 4, we find that judicial independence (JI) negatively impacts income change for East Asian Miracle states at statistically significant level at 10%.

While overall effect of judicial independence on income and income change is statistically not significant in East Asia, we now test whether the Asian Financial Crisis had any impact on such relationship.

Table4. Panel Regression before and after Asian Financial Crisis for East Asian Miracle states group (Miracle6)

VARIABLES	(1) Income	(2) Income	(3) Income%	(4) Income%
Gov. Cons.	-0.000589	-0.000536	-0.279***	-0.281***
	(0.00499)	(0.00503)	(0.0678)	(0.0672)
Energy Imports	-0.000275	-0.000172	-0.00337	-0.00373
	(0.000224)	(0.000227)	(0.00315)	(0.00307)
Gross Capital	0.0137***	0.0151***	0.120**	0.114**
	(0.00314)	(0.00325)	(0.0464)	(0.0464)
Trade	-0.00132	-0.00179*	0.0273*	0.0290**
	(0.000996)	(0.000947)	(0.0143)	(0.0144)
Real GDP	0*	0	-0	-0
	(0)	(0)	(0)	(0)
Potent Labor	0.0646***	0.0492***	0.165**	0.223**
	(0.0115)	(0.0109)	(0.0833)	(0.0882)
During Cold War		-0.215***		0.808**
		(0.0454)		(0.382)
JI	0.484**	0.255	0.840	1.692
	(0.243)	(0.266)	(2.270)	(2.365)

Miracle6*JI	0.374	0.374	-8.034	-8.022
	(0.772)	(0.713)	(6.163)	(6.103)
After	-0.0504	-0.0548	3.245***	3.272***
	(0.0586)	(0.0582)	(1.021)	(1.011)
Miracle6*After	0.587	0.525	-3.663	-3.453
	(0.698)	(0.642)	(2.487)	(2.475)
JI*After	0.563***	0.518***	-3.723***	-3.567***
	(0.0755)	(0.0756)	(1.231)	(1.194)
Miracle6*JI*After	-0.742	-0.589	4.258	3.716
	(1.232)	(1.130)	(3.363)	(3.398)
Constant	3.362***	4.520***	-9.355*	-13.68**
	(0.724)	(0.703)	(5.007)	(5.486)
Observations	3,013	3,013	2,970	2,970
R-squared	0.481	0.510	0.126	0.129
Number of country	130	130	130	130

Although overall results differ based on the model for income or income change, the findings on East Asian Miracle states remain consistent. From all four models above, it is clear that the effects of judicial independence on income for East Asian Miracle states before and after the crisis is not different at statistically significant level. Before concluding that no transformation has taken place in East Asia, one possibility to consider is that transformation may have taken place after the crisis, but the change may have been ephemeral. This is because institutions are persistent, and as a result, may revert back to its old form despite critical juncture taking place from an exogenous shock such as the Asian Financial Crisis. Indeed, scholars have claimed that institutional reform has taken place in East Asia after the crisis, with regards to corporate governance, financial regulatory mechanisms, and liberalization (Hamilton-Hart, 2008; Okabe, 2015; Pempel & Tsunekawa, 2015; Tan, 2000). However, they disagree on how much impact it had, as Hamilton-Hart (2008) notes that change in institutional design (de jure) does not necessarily mean actual practice has changed (de facto). For example, in case of South Korea before the crisis, foreign banks were not allowed to own Korean banks and firms, but now possible after the crisis. Although majority of foreign ownership for Korean banks and corporations were now possible, if risk of foreign entity becoming majority owner came to light, the Korean government would intervene and purchase those banks. In this context, while institutional improvement was made, perhaps it did not last long, as the system reverted to its old mode. We test this by controlling periods immediately after the crisis in the models below.

In these models, we attempt to gauge when reforms stopped, or in another words, when institutional persistence reverted institutions to their old selves. We start by first using the period from 1999-2001, then adding additional years to the time dummy variable, 1999-2002, 1999-2002, and so on. The results support our hypothesis. Up to 2003, or column3, effect of judicial influence on income growth was positive for East Asia. This can be calculated by adding interaction variables with significant results. In column 1, coefficient of Miracle6*Year1999-01 scored negative, approximately -5, but adding the positive effect from Miracle6*JI*Year1999-01, about 8.1, leads to a net positive effect.

Table5. Panel Regression with period of reforms after Asian Financial Crisis for East Asian Miracle states

VARIABLES	(1) Income% 1999-01	(2) Income% 1999-02	(3) Income% 1999-03	(4) Income% 1999-04	(5) Income% 1999-05
Gov. Cons.	-0.291***	-0.289***	-0.288***	-.288***	-.287***
	(0.0701)	(0.0700)	(0.0699)	(0.0694)	(0.0689)
Energy Imports	-0.00400	-0.00401	-0.00398	-0.00389	-0.00385
	(0.00303)	(0.00304)	(0.00308)	(0.00314	(0.00316
Gross Capital	0.114**	0.113**	0.113**	0.116**	0.116**
	(0.0460)	(0.0462)	(0.0463)	(0.0457)	(0.0458)
Trade	0.0290**	0.0291**	0.0294**	0.0296**	0.0301**
	(0.0135)	(0.0136)	(0.0136)	(0.0136)	(0.0137)
Real GDP	-0	-0	-0	0	0
	(0)	(0)	(0)	(0)	(0)
Potent Labor	0.422***	0.422***	0.417***	0.389***	0.361***
	(0.0944)	(0.0935)	(0.0919)	(0.0911)	(0.0882)
During Cold War	0.713*	0.680*	0.698*	0.778**	0.785**
	(0.392)	(0.397)	(0.397)	(0.393)	(0.390)
JI	0.501	0.569	0.661	0.853	1.059
	(2.375)	(2.377)	(2.370)	(2.374)	(2.373)
Miracle6*JI	-10.47	-10.62	-10.52	-10.19	-9.521
	(6.396)	(6.538)	(6.568)	(6.555)	(6.489)
Year 1999-01	0.497				
	(0.558)				
Miracle6*Year1999-01	-5.012**				
	(2.114)				
JI*Year1999-01	-1.042				
	(0.735)				
Miracle6*JI*Year1999-01	8.106**				
	(3.981)				
yr1999-02		0.449			
		(0.540)			
Miracle6*Year1999-02		-4.781**			
		(2.082)			
JI*Year1999-02		-1.202*			
		(0.707)			
Miracle6*JI*Year1999-02		8.208**			
		(3.792)			
Year1999_03			0.777		
			(0.572)		
Miracle6*Year1999-03			-3.759*		
			(1.931)		
JI*Yr1999-03			-1.527**		
			(0.746)		
Miracle6*JI*Year1999-03			6.158**		
			(2.740)		
Year1999_04				1.643**	
				(0.680)	
Miracle6*Year1999-04				-3.309	
				(2.291)	
JI*Year1999-04				-2.245**	
				(0.895)	
Miracle6*JI*Year1999-04				4.860	
				(3.216)	
Year1999-05					2.045***
					(0.671)
Miracle6*Year1999-05					-3.130

					(2.349)
JI*Year1999-05					2.683***
					(0.873)
Miracle6*JI*Year1999-05					3.838
					(3.245)
Constant	-24.43***	-24.46***	-24.28***	-22.92***	-21.45***
	(5.569)	(5.524)	(5.457)	(5.424)	(5.306)
Observations	2,970	2,970	2,970	2,970	2,970
R-squared	0.115	0.115	0.116	0.119	0.121
Number of country	130	130	130	130	130

This trend continues until 2004, or column 4, where the interaction effect between East Asian Miracle states, Judicial Independence, and years from 1999-2004 and years from 1999-2005 are no longer statistically significant. These results show that while the reform did take place in East Asia, its effect did not last permanently. Next, we test whether the similar findings hold for three East Asian states that have resorted to IMF intervention.

IMF Intervened States

Now we test the effects of the crisis on the three states that suffered the most from the crisis. Since IMF requires structural changes in exchange for a bailout, we expect reforms to last longer for IMF intervened states. Applying the analytical framework employed for East Asian Miracle group, we test effects of judicial independence on both income and income growth after controlling for years during the Cold War. The results are below:

Table6. Panel Regression for IMF intervened states

VARIABLES	(1) Income	(2) Income%
Gov. Cons.	0.00104	-0.291***
	(0.00578)	(0.0703)
Energy Import	-0.000206	-0.00408
	(0.000286)	(0.00301)
Gross Capital	0.0129***	0.116**
	(0.00363)	(0.0456)
Trade	0.000163	0.0284**
	(0.00112)	(0.0132)
Real GDP	0*	-0
	(0)	(0)
Potent Labor	0.0620***	0.436***
	(0.0106)	(0.0957)
During Cold War	-0.271***	0.743*
	(0.0507)	(0.378)
JI	0.389	0.691
	(0.295)	(2.336)
IMF3*JI	0.865	-18.79***
	(0.759)	(2.389)
Constant	3.626***	-25.47***
	(0.690)	(5.631)
Observations	3,013	2,970
R-squared	0.440	0.117
Number of country	130	130

The column 2 shows that for the period from 1981 – 2007, judicial independence has negative effects on income growth for the three East Asian states. Compared to rest of the East Asian Miracle states, not only is the coefficient much higher, but is statistically more robust. Next, we examine effects of the crisis by examining years after the crisis.

Table7. Panel Regression before and after Asian Financial Crisis for IMF intervened states

VARIABLES	(1) Income	(2) Income%
Gov. Cons.	-0.000393	-0.282***
	(0.00501)	(0.0675)
Energy Import	-0.000155	-0.00384
	(0.000228)	(0.00306)
Gross Capital	0.0141***	0.120***
	(0.00336)	(0.0449)
Real GDP	0	0
	(0)	(0)
Trade	-0.00147	0.0271*
	(0.000964)	(0.0137)
Potent Labor	0.0477***	0.241***
	(0.0111)	(0.0889)
During Cold War	-0.214***	0.807**
	(0.0455)	(0.384)
JI	0.237	1.978
	(0.264)	(2.323)
IMF3*JI	1.280*	-17.09***
	(0.752)	(2.963)
After	-0.0315	3.125***
	(0.0589)	(0.992)
IMF3*After	-0.478	-1.578
	(0.732)	(2.304)
JI*After	0.497***	-3.454***
	(0.0770)	(1.174)
IMF3*JI*After	0.758	2.133
	(1.155)	(2.697)
Constant	4.611***	-14.87***
	(0.710)	(5.537)
Observations	3,013	2,970
R-squared	0.508	0.131
Number of country	130	130

Both income and income growth do not display statistically significant results per interaction between the three IMF intervened states, Judicial Independence, and years after the crisis – IMF3*JI*After. This implies that although judicial independence has a negative effect on the three IMF intervened states, the effect after the crisis is not significant compared to the previous years from 1991 to 1996. However, since the crisis could have had immediate impact after the crisis through reforms, and waned afterwards, we now test years after the crisis. To test the lasting effects of the reform, we added a year dummy variable increasing by one-year increment until the interaction between the respected period, judicial independence,

and three IMF-intervened states stopped showing statistically significant results. The results are below.

The regression results below test years from 1999 to 2003. In order to measure the lasting effects of the reform, we interacted different time period for each regression. First column measures effects of reform from 1999-2001, column 2 from 1999-2002, and the third column from 1999-2003. We find a clear pattern that for each of those periods, effects of judicial independence on income for the three East Asian states are positive and statistically significant. This means that for these periods, the effects of judicial independence on income are marginally higher than the rest of the world, an indication that reform has led to improvements. Such improvement, however, is marginally decreasing, as the coefficients for each period decreases.

Table8. Panel Regression with period of reforms after Asian Financial Crisis for IMF intervened states

VARIABLES	(1) Income % 1999-01	(2) Income% 1999-02	(3) Income% 1999-03
Gov. Cons.	-0.290*** (0.0702)	-0.289*** (0.0701)	-0.288*** (0.0700)
Energy Imports	-0.00403 (0.00304)	-0.00405 (0.00305)	-0.00403 (0.00309)
Gross Capital	0.115** (0.0459)	0.115** (0.0461)	0.115** (0.0460)
Real GDP	-0 (0)	-0 (0)	-0 (0)
Trade	0.0287** (0.0133)	0.0289** (0.0133)	0.0290** (0.0133)
Potent Labor	0.434*** (0.0951)	0.435*** (0.0942)	0.430*** (0.0925)
During Cold War	0.718* (0.392)	0.683* (0.398)	0.701* (0.397)
JI	0.794 (2.344)	0.863 (2.344)	0.953 (2.337)
IMF3*JI	-19.04*** (2.622)	-19.54*** (2.672)	-19.54*** (2.623)
Year1999-2001	0.432 (0.551)		
IMF3*Year1999-2001	-3.631*** (1.280)		
JI*Year1999-2001	-1.010 (0.733)		
IMF3*JI*Year1999-2001	6.874*** (2.370)		
Year1999-2002		0.387 (0.530)	
IMF3*Year1999-2002		-2.905** (1.295)	
JI*Year1999-2002		-1.173* (0.703)	
IMF3*JI*Year1999-2002		6.435*** (2.302)	

Year1999-2003			0.719
			(0.559)
IMF3*Year1999-2003			-2.138*
			(1.111)
JI*Year1999-2003			-1.501**
			(0.740)
IMF3*JI*Year1999-2003			4.734***
			(1.461)
Constant	-25.40***	-25.43***	-25.25***
	(5.627)	(5.582)	(5.515)
Observations	2,970	2,970	2,970
R-squared	0.118	0.119	0.119
Number of country	130	130	130

This pattern lasts until the period from 1999-2004, but stops in the period 1999-2005, as the interaction between 1999-2005, three IMF intervened states, and Judicial independence no longer shows statistically significant results.

Table9. Panel Regression with period of reforms after Asian Financial Crisis for IMF intervened states (continued from Table8)

VARIABLES	(1) Income% 1999-2004	(2) Income% 1999-2005
Gov. Cons.	-0.288***	-0.287***
	(0.0695)	(0.0691)
Energy Imports	-0.00395	-0.00393
	(0.00314)	(0.00316)
Gross Capital	0.118***	0.119***
	(0.0452)	(0.0451)
Real GDP	0	0
	(0)	(0)
Trade	0.0290**	0.0290**
	(0.0132)	(0.0132)
Potent Labor	0.402***	0.375***
	(0.0917)	(0.0889)
During Cold War	0.780**	0.786**
	(0.393)	(0.391)
JI	1.145	1.354
	(2.339)	(2.336)
IMF3*JI	-19.23***	-18.75***
	(2.567)	(2.423)
Year1999-2004	1.577**	
	(0.663)	
IMF3*Year1999-2004	-1.949*	
	(1.162)	
JI*Year1999-2004	-2.213**	
	(0.884)	
IMF3*JI*Year1999-2004	3.844**	
	(1.571)	
Year1999-2005		1.957***
		(0.655)
IMF3*Year1999-2005		-1.417
		(1.164)
JI*Year1999-2005		-2.631***

		(0.862)
IMF3*JI*Year1999-2005		2.396
		(1.542)
Constant	-23.91***	-22.48***
	(5.480)	(5.362)
Observations	2,970	2,970
R-squared	0.122	0.124
Number of country	130	130

7. Policy Implications and Limitations

Our regression results illustrate several important implications. First, the Asian Financial Crisis did lead to reform as existing literature suggests. Our research found that after the crisis, the reforms led to improvements, as the relationship between judicial independence and income improved for both the IMF intervened states and East Asian Miracle states. However, the results also confirm other literature that institutions are path dependent and persistent, as the improvements only lasted until 2003 and 2004 for East Asian Miracle states and IMF intervened states.

Second, three state that have suffered the most from the crisis, or the IMF intervened states, display strong negative relationship between judicial independence and income growth, compared to the East Asian Miracle states, as regression results from Table3 and Table6 show that statistical significance for IMF intervened states is more robust with higher negative coefficient. Perhaps this result should not come as a surprise. Although we cannot measure the magnitude of relational governance that served as an engine of growth for these states, if arguments by Li (2003), Rajan and Zingales (1998), and others are true that relational governance and the Asian Financial Crisis are related, then one may project that greater the reliance on government intervention, the greater severity suffered from the crisis. Since greater reliance on government intervention (strong government unconstrained by law) goes against the notion of rule of law that embodies constraining the government under the law, finding that the three IMF intervened states have stronger negative relationship between judicial independence and income growth than rest of the East Asian Miracle states should not come as a surprise.

Third, our research suggests that reforms lasted longer for IMF intervened states that agreed to undergo IMF structural adjustments and changes in exchange for funds. Comparing Table 5 and Table 9, reform lasted until 2004 IMF intervened states, whereas the reform last until 2003 for East Asian Miracle states.

Fourth, some research has suggested that the Asian Financial Crisis threatened the very existence of East Asia's developmental states. Our research has shown that although the crisis did lead to reforms that weakened developmental states in terms of strengthening reliance on judicial independence for growth, that did not last long, as the analysis shows IMF intervened states reverted to its old practice after 2004.

Fifth, our research highlights that international norms matter when conducting analysis on East Asia and the effect of Asian Financial Crisis. Our research suggests that

international environments such as the bipolar structure during the Cold War matters, as Table 1 and 2 show that controlling those period no longer made effects of judicial independence on income no longer statistically significant.

Despite these findings, our research has several limitations that we hope to address in the near future. Our biggest limitation lies with not addressing the reverse-causality problem, as income growth also affects judicial independence. Daron Acemoglu et al. (2000) deals with this problem by instrumenting mortality rates of pre-colonized states before colonization. Although this measure has been widely used as an exogenous instrument for institution when measuring its effect on growth, the sample size is small and do not include countries of our interest, East Asian states. Another option we considered and tried was using lagged variable, both as a lagged explanatory variable and as an instrument. The problem with this approach is that the degree of inconsistency is larger than cases without considering financial crisis. This is because periods of financial crisis significantly differ from periods without it.

Second, our regression model with respect to growth in income has a low explanatory power (low R-squared), especially for the cross-sectional variation. Therefore, better fit of the overall model needs to be addressed.

Appendix

A. Data

Variable Type	Concept	Measure	Source
Dependent	Economic Development	Income Income%	World Development Indicator (WDI)
Main Explanatory	Institutional Quality	*De facto* Judicial Independence	Linzer & Staton's Dataset[2]
Independent	Physical Capital	Gross Fixed Capital (% of GDP)	WDI
	Trade	Net Trade volume (% of GDP)	WDI
	Level of Technology	Real GDP	WDI
	Potential Labor Force	% of Population 15-64	WDI
Control	Government Intervention/ Consumption	General Government Final Consumption (% of GDP)	WDI
	Foreign Energy Dependence	Net Energy Imports (% of energy use)	WDI

[2] For more information on the dataset please refer to Linzer and Staton (2015)

Country Group Dummy	IMF bailout countries, Most severely affected by the crisis	South Korea, Indonesia, Thailand	IMF3
	East Asian Miracle States, Less affected by the crisis	IMF3 + Philippines, Malaysia, Singapore	Miracle8
Year Dummy	After Crisis	1999-2007	After
	During Cold War	1981-1990	During Cold War
	Years of Reform	1999-2001	yr199901
		1999-2002	yr199902
		1999-2003	yr199903
		1999-2004	yr199904
		1999-2005	Yr199905

B. Correlation Table

	Income%	Income	trade	gov_cons	JI	Grosscap	Energy Imp	Potential Labor	realGDP
Income%	1								
Income	0.1022	1							
Trade	0.1246	0.251	1						
Gov. Cons.	-0.1112	0.309	0.0564	1					
JI	0.0957	0.7127	0.0802	0.1946	1				
Gross Capital	0.221	0.17	0.2362	0.0267	0.0888	1			
Energy Imports	0.0793	-0.031	0.0062	-0.1254	0.259	-0.0042	1		
Potent Labor	0.2212	0.7101	0.3025	0.1127	0.5617	0.2726	0.2012	1	
Real GDP	0.0193	0.304	-0.1743	0.0255	0.2616	0.0313	0.0719	0.2068	1

C. Hausman Test Results

a. Dependent Variable = Income%

Coefficients				
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	random	Difference	S.E.

Trade	0.0261544	0.0128405	0.0133139	0.004096
Gov. Cons.	-0.2962411	-0.2069627	-0.089278	0.0205358
JI	-1.320219	-0.1535513	-1.166668	0.9906527
Energy Imports	-0.0036644	-0.0009881	-0.002676	0.0010007
Gross Capital	0.1213069	0.1129376	0.0083693	0.0059679
Potent Labor	0.3499362	0.2144785	0.1354577	0.0295614
Real GDP	-2.22E-13	-7.44E-14	-1.48E-13	1.53E-13

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 102.26
Prob>chi2 =0.00

⇨ Reject the null for fixed effect model

b. Dependent Variable = Income

Coefficients				
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	random	Difference	S.E.
Trade	0.0009749	0.0010074	-0.0000325	0.0000794
Gov. Cons.	0.0012691	0.0038929	-0.0026238	0.0002102
JI	0.7492118	0.9571533	-0.2079415	0.0271016
Energy Imports	-0.0003506	-0.000469	0.0001184	0.0000209
Gross Capital	0.0109199	0.0107919	0.000128	.
Poten tLabor	0.0854943	0.0882451	-0.0027508	0.0005372
Real GDP	2.86E-13	2.85E-13	9.95E-16	1.94E-15

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(2) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 143.40
Prob>chi2 =0.00

⇨ Reject the null for fixed effect model

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