Analysis for Income and Democracy (Acemoglu et al. 2008)

Table 2 and Table 3: Fixed Effects Results

1. Coefficients on lagged democracy are highly significant, which suggest high degree of persistence in democracy. These results are same with the paper.

2. Coefficients on log income per capita are much smaller.

(1) For example: In Table 2, the coefficient on log income per capita decreased dramatically from 0.08 (significant) to 0.01 (insignificant);

(2) In Table 3, the coefficient on log income per capita decreased from 0.05 (significant) to -0.01 (significant);

(3) Using fixed effects proxing for country-specific effects removes the cross-country correlation between income and democracy.

3. Conclusion: from these 2 tables, we don't see strong causa effect of income on democracy.

Table2

	Pooled OLS (1)	Fixed effects (2)	Anderson-Hsiao IV (3)	Arellano-Bond GMM (4)	Fixed effects OLS (5)	Fixed effects OLS (6)	Fixed effects OLS (7)	Fixed effects OLS (9)
lag(Democracy.5yr)	0.69 ***	0.38 ***		0.51 ***				
	(0.03)	(0.05)		(0.14)				
lag(Income.5yr)	0.08 ***	0.01		-0.00	0.05			
	(0.01)	(0.03)		(0.20)	(0.04)			
year	-0.00 ***		0.00 *					
	(0.00)		(0.00)					
lag(diff(Democracy.5yr))			0.55 ***					
			(0.10)					
lag(diff(Income.5yr))			-0.18					
			(0.12)					
3				0.05				
				(0.04)				
4				0.01				
				(0.06)				
5				-0.10				
				(0.09)				
6				-0.05				
				(0.11)				
7				0.04				
				(0.12)				
8				0.03				
				(0.15)				
9				0.06				
				(0.15)				
10				0.09				
				(0.18)				
11				0.09				
				(0.18)				
lag(Democracy.annual)					0.82 ***			
					(0.02)			
lag(Income.annual)					-0.01			
					(0.01)			
lag(Democracy.10yr)						-0.02		
						(0.07)		
lag(Income.10yr)						0.05		
						(0.06)		
lag(Democracy.20yr)							-0.58 ***	
							(0.12)	
lag(Income.20yr)							-0.03	
							(0.09)	

Table3

	Pooled OLS (1)	Fixed effects (2)	Anderson-Hsiao IV (3)	Arellano-Bond GMM (4)	Fixed effects OLS (5)	Fixed effects OLS (6)	Fixed effects OLS (7)	Fixed effects OLS (9)
lag(Democracy1.5yr)	0.76 ***	0.45 ***		0.61 ***				
	(0.03)	(0.06)		(0.11)				
lag(Income1.5yr)	0.05 ***	-0.01		-0.31 *	-0.01			
	(0.01)	(0.04)		(0.13)	(0.05)			
year	-0.00 ***		0.00 *					
	(0.00)		(0.00)					
lag(diff(Democracy1.5yr))			0.63 ***					
			(0.12)					
lag(diff(Income1.5yr))			-0.24					
			(0.15)					
3				0.05				
				(0.03)				
4				0.06				
				(0.05)				
5				0.12				
				(0.06)				
6				0.15				
				(0.08)				
7				0.21 *				
				(0.09)				
8				0.27 *				
				(0.10)				
9				0.35 **				
				(0.11)				
10				0.42 **				
				(0.13)				
11				0.39 **				
				(0.14)				
lag(Democracy1.annual)					0.89 ***			
					(0.01)			
lag(Income1.annual)					-0.01			
					(0.01)			
lag(Democracy1.10yr)						0.06		
						(0.08)		
lag(Income1.10yr)						0.01		
						(0.06)		
lag(Democracy1.20yr)							-0.52 ***	
							(0.10)	
lag(Income1.20yr)							-0.13	
							(0.10)	

Table 4: Robustness Checks

1. The results in general are consistent with Table 2 and Table 3.

2. Robustness checks:

(1) Col (1) and Col (2) generate similar results using sample of countries from 1970 to 2000;

(2) Col (3) and Col (4) also generate similar results using samples excluding former socialist countries.

(3) Col (5) and Col (7) included more variables to check the influnece of other regressors on the relationship between income and democracy. The coefficients on lagged democracy and log income per capita are very similar to results in other columns. We can see that the other regressors don't really affect the relationship between income and democracy when we include fixed effects.

Table4

	Fixed effects OLS (1)	Arellano-Bond GMM (2)	Fixed effects (3)	Arellano-Bond GMM (4)	Fixed effects OLS (5)	Fixed effects OLS (7)
lag(Democracy.1970_2000)	0.32 ***	0.28				
	(0.06)	(0.17)				
lag(Income.1970_2000)	-0.05	-0.63 *				
	(0.04)	(0.29)				
3		0.13 ***		0.02		
		(0.04)		(0.03)		
4		0.22 ***		0.09 *		
		(0.07)		(0.04)		
5		0.28 **		0.12 *		
		(0.09)		(0.05)		
6		0.31 **		0.18 **		
		(0.11)		(0.06)		
7		0.38 **		0.21 ***		
		(0.13)		(0.06)		
lag(Democracy.no_socialist)			0.34 ***	0.39 ***		
			(0.05)	(0.10)		
lag(Income.no_socialist)			-0.03	-0.23		
			(0.04)	(0.12)		
8				0.19 **		
				(0.07)		
9				0.28 ***		
				(0.08)		
lag(Democracy.1960_2000)				0.35 ***	0.35 ***	
				(0.05)	(0.05)	
lag(Income.1960_2000)				0.01	-0.00	
				(0.04)	(0.04)	
lag(lpop)				-0.11	-0.04	
				(0.09)	(0.10)	
lag(medage)				0.03	0.01	
				(0.02)	(0.02)	
lag(age_veryyoung)				2.35	0.69	
				(1.61)	(1.64)	
lag(age_young)				1.40	-0.22	
				(1.32)	(1.34)	
lag(age_midage)				-1.07	-1.34	
				(1.29)	(1.32)	
lag(age_old)				0.22	0.66	
				(1.18)	(1.33)	
lag(education)					-0.01	
					(0.02)	

Table 5: 2SLS with Saving Rate Instrument

1. In Col (1) for the pooled OLS model, log income per capita has a much larger effect on democracy than the results in earlier tables. This makes sense because we didn't include the lagged democracy variable.

2. In Col (2) and Col (3), after using fixed effects, the large effect of log income per capita on democracy disappeared.

	Pooled OLS (1)	Fixed effects (2)	Fixed effects (3)
lag(Income.IV_saving)	0.18 ***	-0.02	-0.03
	(0.03)	(0.07)	(0.08)
year	-0.00 ***		
	(0.00)		
lag(Democracy.IV_saving)			0.38 ***
			(0.05)

Table5

Table 6: 2SLS with World Income Instrument

1. In Col (1) for the pooled OLS model, log income per capita has a much larger effect on democracy than the results in earlier tables. This makes sense because we didn't include the lagged democracy variable.

2. In Col (2) and Col (3), after using fixed effects, the large effect of log income per capita on democracy disappeared.

3. These results are very similar to Table 5.

	Pooled OLS (1)	Fixed effects (2)	Fixed effects (3)
lag(Income.IV.world_income)	0.17	-0.21	-0.12
	(0.13)	(0.12)	(0.10)
year	-0.00		
	(0.00)		
lag(Democracy.IV.world_income)			0.39 ***
			(0.04)

Table6

Table 7: Fixed Effects Results In The Long Run

1. Panel A and Panel B generate similar results.

(1) In pooled OLS model, the coefficients on log income oer capita is large; but after using fixed effects, the coefficients become very small and insignificant.

(2) We can conclude here that in the past 100 years, there's no causal effect of income on democracy in the past 100 years.

(3) This finding is consistent with the paper.

Table7_PanelA

	Pooled OLS (1)	Fixed effects OLS (2)	Arellano-Bond GMM (3)	Fiexed effects OLS (4)	Fixed effects OLS (5)
lag(Democracy.25yr)	0.47 ***	0.19 *	0.43		
	(0.08)	(0.09)	(0.22)		
lag(Income.25yr)	0.14 ***	-0.02	-0.50	0.00	
	(0.03)	(0.10)	(0.27)	(0.10)	
year	-0.00 **				
	(0.00)				
3			0.11		
			(0.08)		
4			0.37 *		
			(0.18)		
5			0.62 *		
			(0.31)		
6			0.76 *		
			(0.38)		
7			1.28 *		
			(0.57)		
lag(Democracy1.25yr)				0.21	
				(0.12)	
lag(Income1.25yr)				0.07	
				(0.10)	

Table7_PanelB

	Pooled OLS (1)	Fixed effects OLS (2)	Arellano-Bond GMM (3)	Fiexed effects OLS (4)	Fixed effects OLS (5)
lag(Democracy.50yr)	0.19	-0.25 **	0.19		
	(0.10)	(0.08)	(0.31)		
lag(Income.50yr)	0.25 ***	0.04	-0.46	-0.00	
	(0.04)	(0.09)	(0.30)	(0.09)	
year	-0.00 ***				
	(0.00)				
3			0.26		
			(0.19)		
4			0.87 *		
			(0.39)		
lag(Democracy1.50yr)					-0.27
					(0.14)
lag(Income1.50yr)					0.03
					(0.17)

Table 8A: Democracy In The Very Long Run

In Col (2) through Col (4), after adding proxies and religion variables that could affect the relationship between income and democracy, the coefficients on log income per capita become much smaller.

(1) For example, in Col (4), the coefficient on log income per capita is only 0.05 (compared with 0.13 in Col (1)).

(2) The coefficients on constraint on the executive at independence, independence year, and religions are very large in absolute value.

(3) This shows that the proxies and religion variables can predict changes greater changes in democracy in the past 500 years.

Table8A

	OLS (1)	OLS (2)	OLS (3)	OLS (4)
(Intercept)	0.40 ***	4.37 ***	0.48 ***	3.03 **
	(0.05)	(0.87)	(0.08)	(0.95)
Income.500yr	0.13 ***	0.06 *	0.09 ***	0.05
	(0.02)	(0.03)	(0.02)	(0.02)
consfirstaug		0.26 ***		0.16 *
		(0.07)		(0.07)
indcent		-0.21 ***		-0.13 **
		(0.04)		(0.05)
rel_catho80			0.15	0.12
			(0.08)	(0.09)
rel_muslim80			-0.30 **	-0.23 *
			(0.10)	(0.10)
rel_protmg80			0.19	0.18
			(0.10)	(0.10)

Table 8B: Democracy In The Very Long Run (Continued)

1. Col(1) through Col (4) include same variables as in Table 8A, and they generate very similar results.

2. Col(5) gives interesting result: after adding log of the population density of the indigenous population, the coefficient on log income per capita becomes smaller but still significant; the coefficient on log of the population is negative (expected sign) and significant.

3. In general, after we add proxies for divergent development paths of former colonies, the correlation between changes in income and democracy disappears.

```
==========================================================================================
               OLS (1)    OLS (2)    OLS (3)    OLS (4)    OLS (5)    OLS (6)    OLS (7)
------------------------------------------------------------------------------------------
(Intercept)     0.41 ***   4.09 ***   0.30 **    2.31       0.53 ***   3.98 ***   2.87
               (0.05)     (0.93)     (0.09)     (1.61)     (0.06)     (0.99)     (1.66)
Income1.500yr   0.14 ***   0.07       0.10 ***   0.06       0.08 *     0.02       0.03
               (0.02)     (0.03)     (0.02)     (0.03)     (0.03)     (0.04)     (0.04)
consfirstaug                0.19                  0.19                  0.17       0.17
                           (0.10)                (0.11)                (0.10)     (0.11)
indcent                    -0.19 ***             -0.10                 -0.18 ***  -0.13
                           (0.05)                (0.08)                (0.05)     (0.08)
rel_catho80                            0.31 **    0.28                             0.20
                                      (0.10)     (0.16)                           (0.17)
rel_muslim80                           0.02       0.06                             0.04
                                      (0.13)     (0.13)                           (0.15)
rel_protmg80                           0.51 *     0.49 *                           0.41
                                      (0.21)     (0.21)                           (0.24)
lpd1500s                                                     -0.06 **   -0.05 *    -0.03
                                                             (0.02)     (0.02)     (0.02)
Table8B ==========================================================================================
```

Conclusion:

My results match the paper:

(1) The long run correlation between changes in income and democracy disappears after including proxies for the divergent development paths.

(2) The diverent development paths account for a large amount of cross-country correlation between income and democracy.

Analysis for Quantitle Regression (Harding et al. 2011)

Table 4.2: Quantitle Regression Results

1. Model 1: Pooled OLS

(1) After adding region and year effects, there's a significant reduction in the effect of income on democracy at all quantiles. Intuitively, this makes sense.

(2) After adding region and year effects, the effect of income becomes small and negligible, with the exception of quantiles at upper tails.

(3) However, most of the coefficients in my analysis turned to negative (wrong sign). In the original paper, all signs are positive.

2. Model 3: Fixed Effects

(1) All of the coefficients in my analysis are positive, but all most of the signs are negative in the original paper.

(2) The pattern in Model 1 also disappeared: the coefficients at upper tails can be greater or smaller than those at lower tails.

Model 1: Pooled OLS (without Region and Year Effects)

```
              tau= 0.10   tau= 0.25   tau= 0.50    tau= 0.75    tau= 0.90
lag(Income) 0.06245170 0.292213687  0.27266847  0.144548790  0.057501898
lag(lpop)   0.01193844 0.007390393 -0.01248087 -0.006686497 -0.004946255
```

Mean

```
lag(Income)   lag(lpop)
0.222669058 0.002719486
```

Model 1: Pooled OLS (with Region Effects)

```
                tau= 0.10     tau= 0.25   tau= 0.50   tau= 0.75   tau= 0.90
lag(Income) 6.141643e-16 -4.313045e-17 -0.02452689 -0.04005437 -0.04864393
lag(lpop)   1.367162e-15  1.173096e-15  0.15504806  0.21146077  0.20834647
```

Mean

```
lag(Income)   lag(lpop)
0.005686592 0.262019361
```

Model 1: Pooled OLS (with Region and Year Effects)

```
                tau= 0.10     tau= 0.25   tau= 0.50   tau= 0.75   tau= 0.90
lag(Income) 4.893003e-17 -5.235224e-16 -0.02065839 -0.04062680 -0.10851120
lag(lpop)   3.024389e-15  2.934317e-15  0.08611547  0.05390281  0.02438486
```

Mean

```
lag(Income)   lag(lpop)
-0.05385746 -0.01124519
```

Model 3: Fixed Effects (with Region Effects)

```
lag(Income)[0.1] lag(Income)[0.25] lag(Income)[0.5] lag(Income)[0.75] lag(Income)[0.9]
      0.22987671         0.25164984        0.23796892         0.15971275        0.06907025
```

Mean

```
lag(Income)   lag(lpop)
0.005686592 0.262019361
```

Model 3: Fixed Effects (with Year Effects)

```
lag(Income)[0.1] lag(Income)[0.25] lag(Income)[0.5] lag(Income)[0.75] lag(Income)[0.9]
      0.07008391         0.26567326        0.26812431         0.16135391        0.07930382
```

Mean

```
lag(Income)   lag(lpop)
-0.05385746 -0.01124519
```