

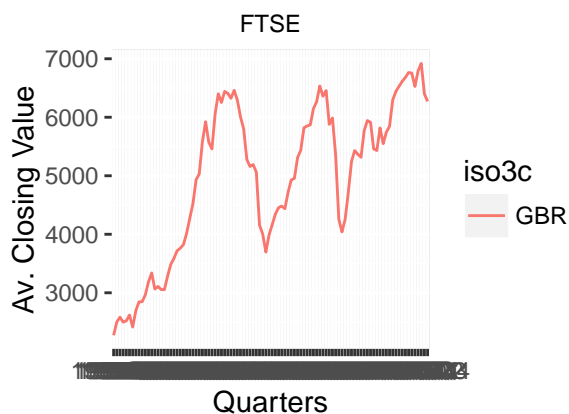
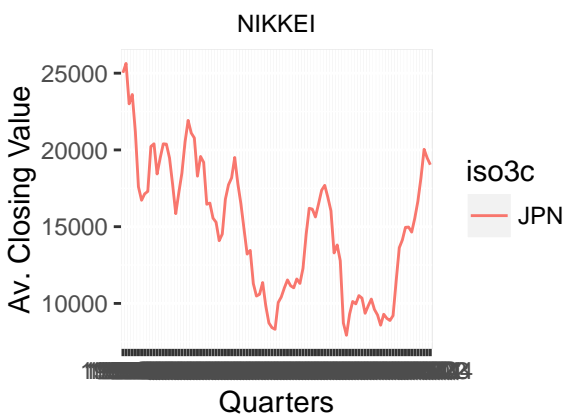
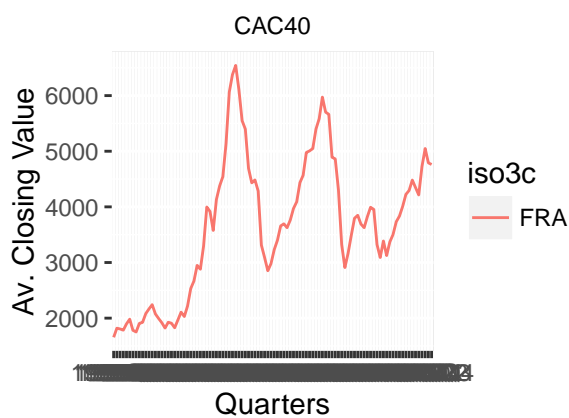
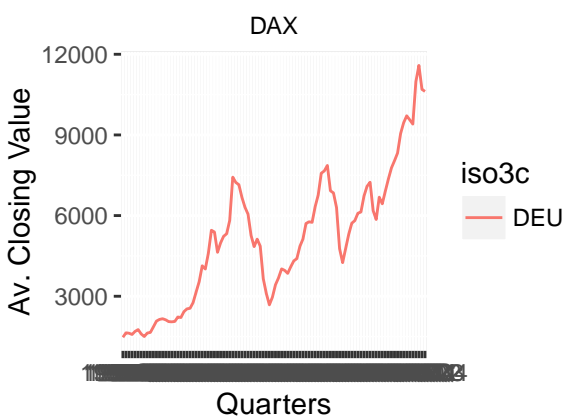
# An odd relation: National Equity Prices and GDP Growth

*Limberg, Daniel & Mueller, Lukas*

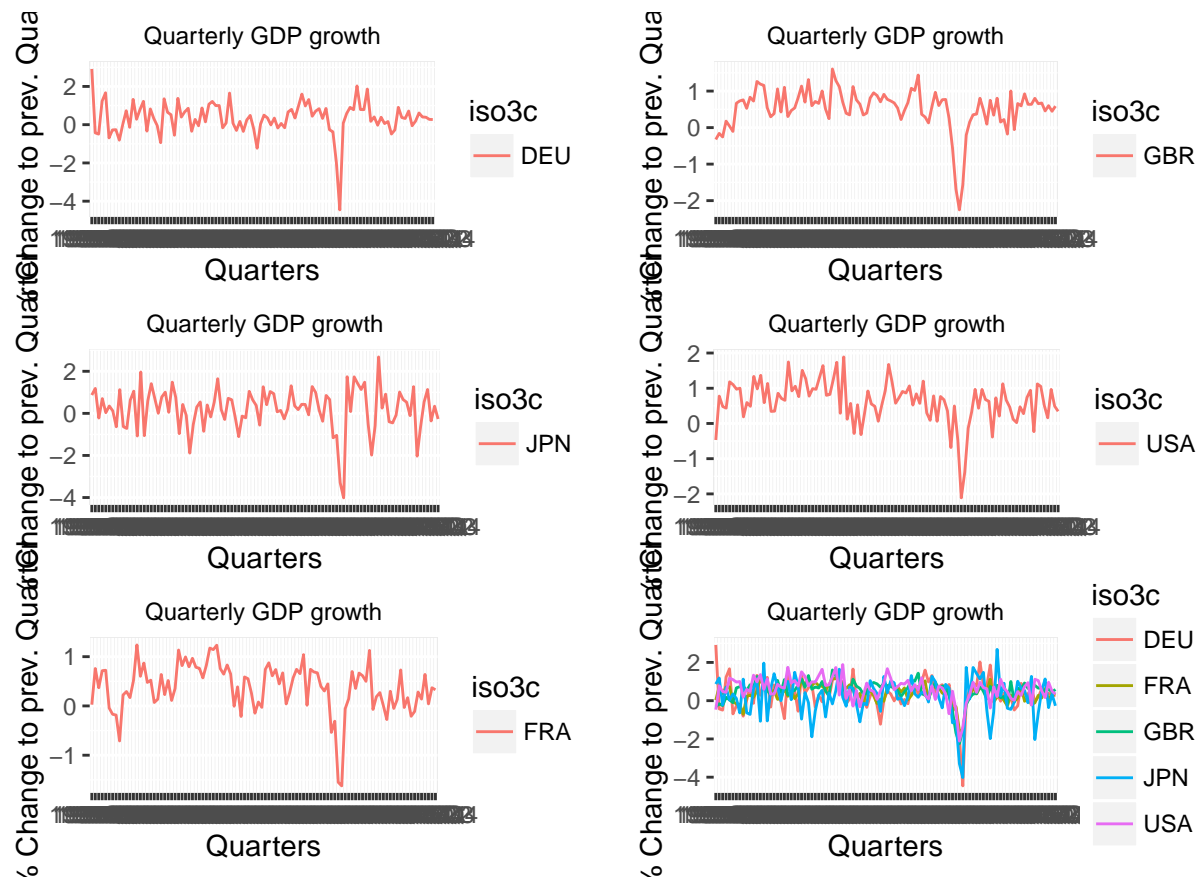
*April 2016*

## Introduction

**Dependent Variable (Equity Prices): Plotting the course over time**



## Key Independent Variable: Quarterly GDP growth



## Measures of Central Tendency for Dependent Variables

### Mean

```
## CAC.Close 3644.90900063648
## DAX.Close 5108.01899696814
## FTSE.Close 4963.75121656249
## NIK.Close 14964.0963262117
```

### Median

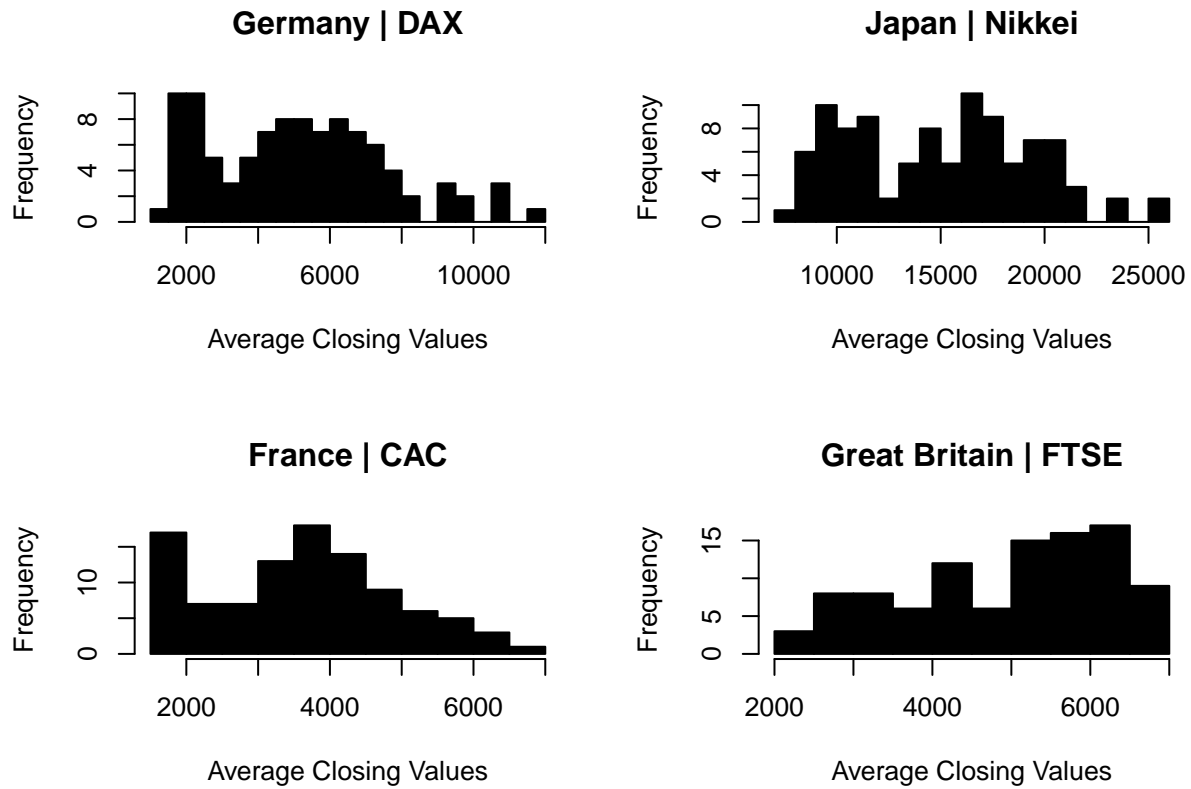
```
## CAC.Close 3693.01904877778
## DAX.Close 5126.28258109073
## FTSE.Close 5313.43939764394
## NIK.Close 15420.5055347541
```

### Standard Dev.

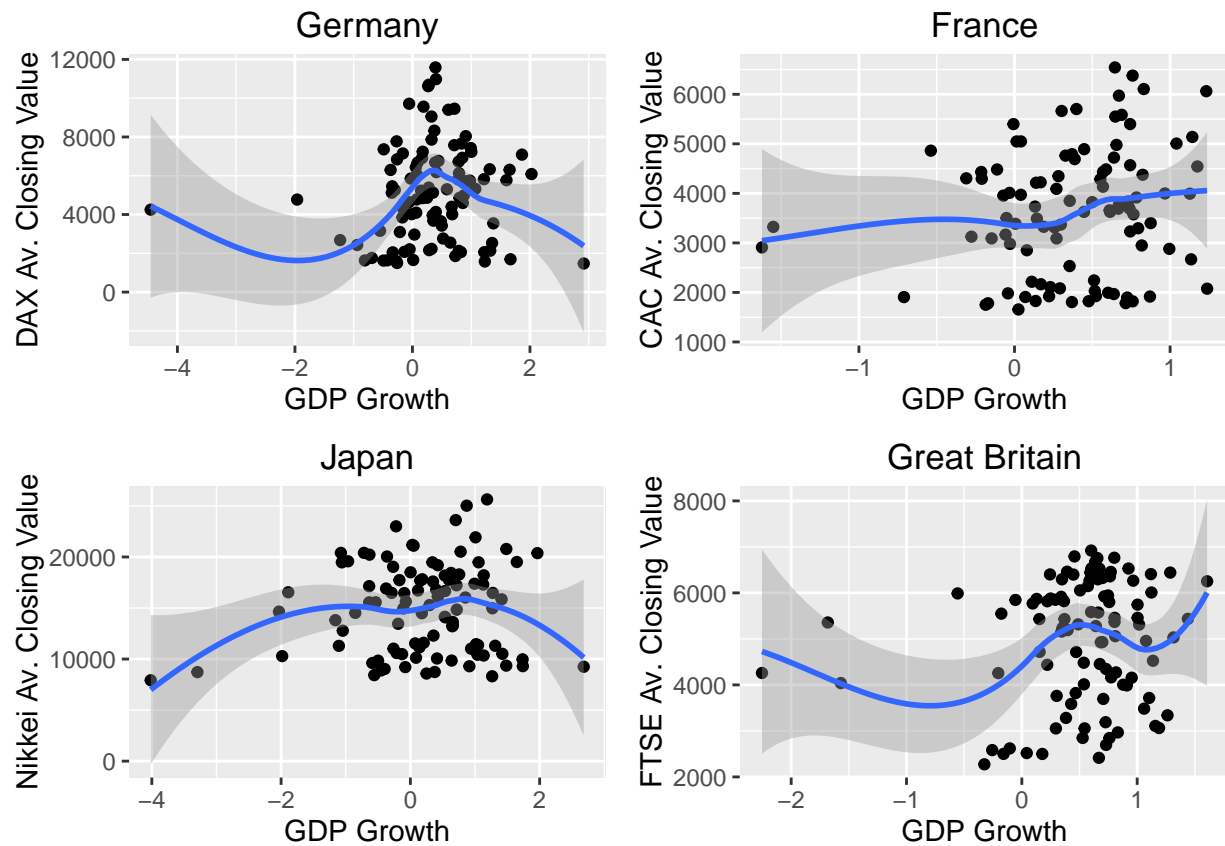
```
## CAC.Close 1259.28084693643
## DAX.Close 2484.10959312582
```

```
## FTSE.Close 1317.91118877795
## NIK.Close 4338.42870932095
```

## Distribution of Dependent Variables: Average Closing Values



## Joint Distributions of DV and Key IV (no lag)



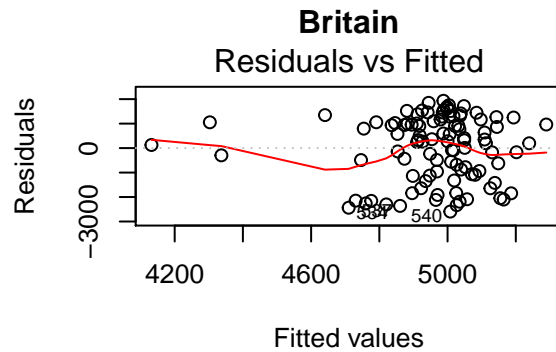
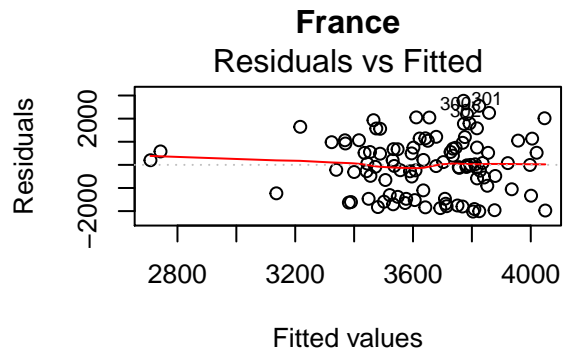
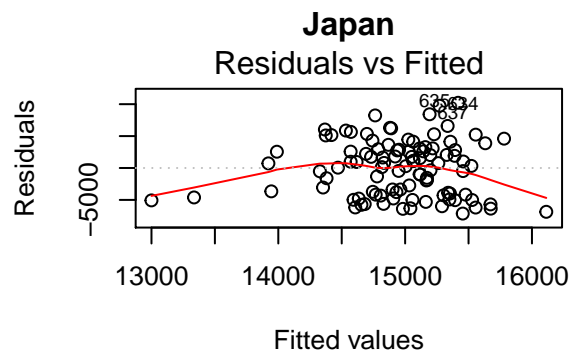
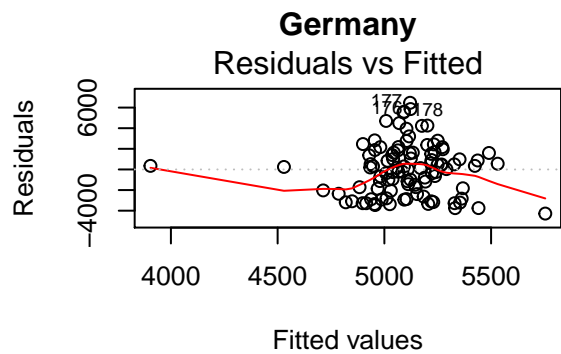
## Inferential Statistics

### Basic Model: OLS

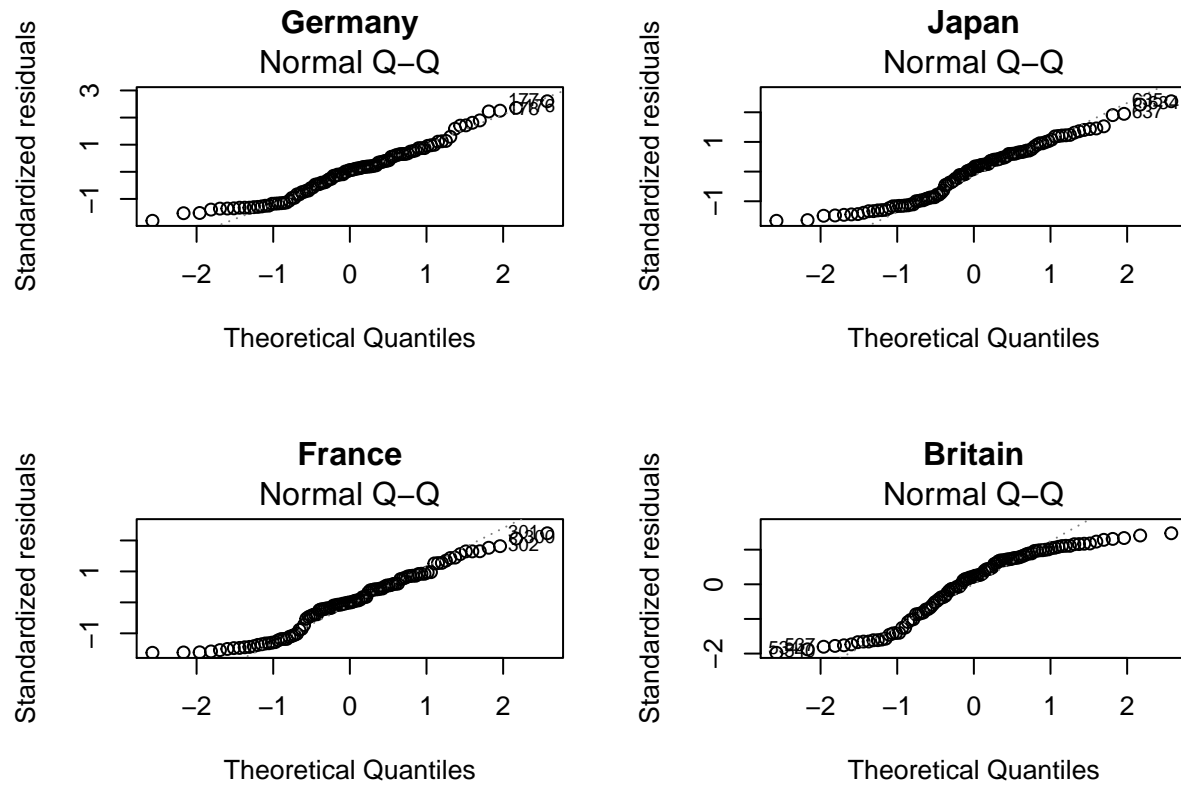
##	=====			
##	Dependent variable:			
##	-----			
##	DAX	Nikkei	CAC	FTSE
##	(1)	(2)	(3)	(4)
##	-----			
## GDP Growth	250.984	464.682	468.756*	299.888
##	(291.353)	(428.015)	(254.963)	(230.050)
##	-----			
## Constant	5,022.205***	14,866.640***	3,468.961***	4,807.586***
##	(268.873)	(444.362)	(157.383)	(178.151)
##	-----			
## Observations	100	100	100	100
## R2	0.008	0.012	0.033	0.017
## Adjusted R2	-0.003	0.002	0.023	0.007

```
## Residual Std. Error (df = 98) 2,497.381    4,351.997    1,249.428    1,318.576
## F Statistic (df = 1; 98)      0.742      1.179      3.380*      1.699
## =====
## Note:                          *p<0.1; **p<0.05; ***p<0.01
```

## Heteroscedasticity Diagnose



## Diagnose of non-normality of Errors

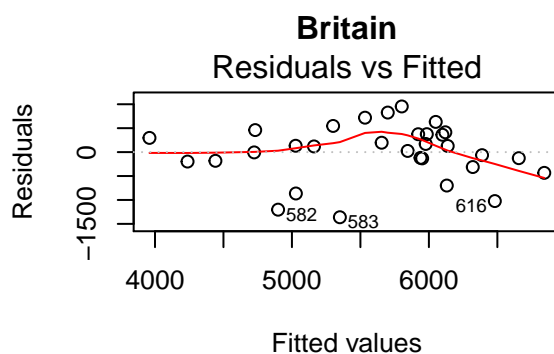
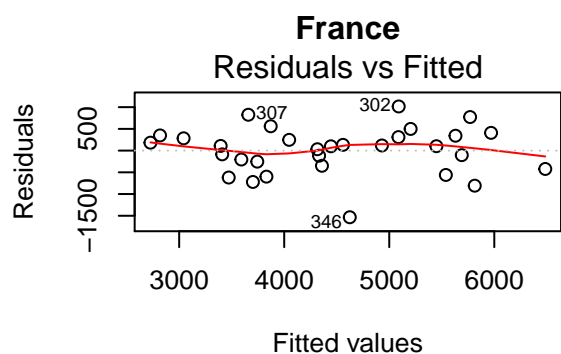
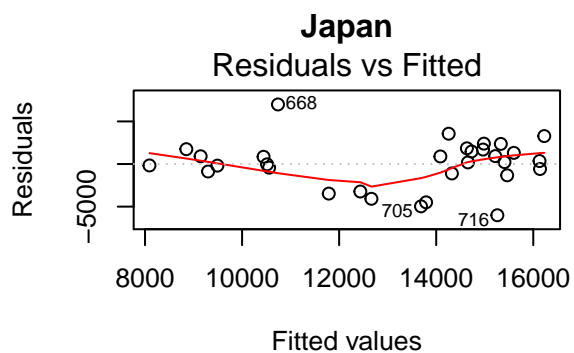
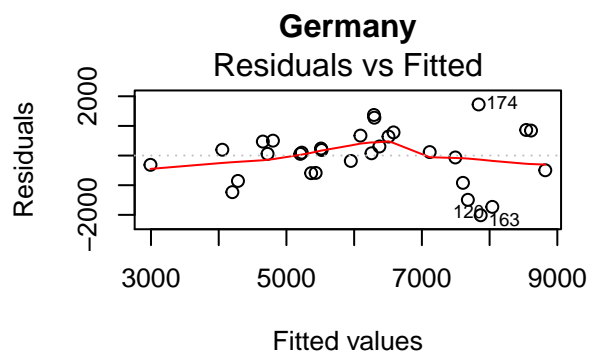


## Expanded Model: OLS

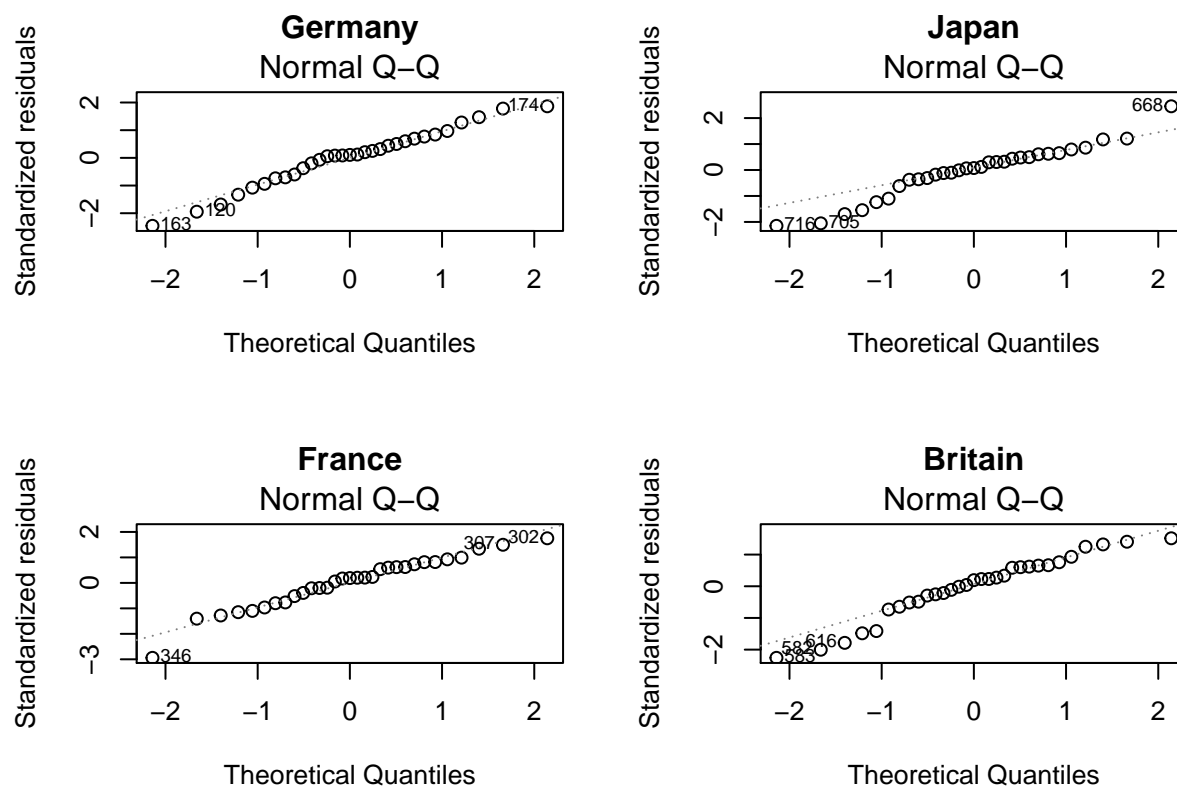
Dependent variable:				
	DAX (1)	Nikkei (2)	CAC (3)	FTSE (4)
GDP Growth	903.035*** (253.941)	503.807 (540.095)	674.218** (259.163)	502.525** (236.713)
Unemployment lagged	-674.000*** (115.223)	-1,935.423 (1,382.908)	-103.719 (161.454)	214.586* (125.120)
Consumption Spending lagged	32.970 (285.594)	-257.163 (553.811)	1,029.723*** (291.522)	148.749 (217.320)
ECB MRO lagged	-1,090.067 (2,421.971)	-446.220 (7,023.913)	701.279 (1,500.039)	-693.061 (1,597.878)
ECB Depos. Facility lagged	3,145.265 (2,204.788)	4,945.423 (6,728.401)	1,043.690 (1,370.782)	2,251.624 (1,462.762)

```
##
## L.WTI          17.769      161.778      33.337      24.894
##              (52.811)    (161.579)    (32.183)    (33.820)
##
## L.Brent       -51.097     -109.237     -44.188     -27.106
##              (55.919)    (175.880)    (33.781)    (36.172)
##
## Constant      11,241.090*** 22,078.720*** 4,906.860*** 4,094.339***
##              (918.124)    (6,220.559)  (1,443.091)  (815.706)
##
## -----
## Observations      31         31         31         31
## R2                0.740      0.462      0.782      0.613
## Adjusted R2       0.661      0.298      0.715      0.495
## Residual Std. Error (df = 23) 1,013.046  3,126.116  612.874  652.784
## F Statistic (df = 7; 23)    9.372***   2.816**   11.761***  5.196***
## =====
## Note:                                     *p<0.1; **p<0.05; ***p<0.01
```

## Heteroscedasticity Diagnose



## Diagnose of non-normality of Errors



## Inferential Statistics - Panel Model: Pooled OLS

Dependent variable:				
	DAX (1)	Nikkei (2)	CAC (3)	FTSE (4)
GDP Growth	351.555** (154.946)	1,299.817*** (289.272)	238.615*** (85.134)	296.009*** (67.953)
Unemployment lagged	-21.736 (57.210)	-93.557 (106.807)	-40.839 (31.434)	-13.341 (25.090)
Consumption Spending lagged	-180.352 (158.278)	370.904 (295.493)	169.884* (86.965)	-0.098 (69.415)
ECB MRO lagged	-4,795.688*** (1,464.874)	-672.914 (2,734.809)	1,484.983* (804.867)	-2,384.378*** (642.438)
ECB Depos. Facility lagged	6,607.784***	6,393.784**	687.397	3,603.007***



```

##              (1,360.906)   (2,540.708)   (747.742)   (596.841)
##
## WTI lagged           40.065       138.217**       29.880       29.996**
##              (33.710)       (62.934)       (18.522)       (14.784)
##
## Brent lagged        -18.928       -144.725**       -33.708*       -16.176
##              (35.994)       (67.199)       (19.777)       (15.786)
##
## Constant           6,358.280***   13,497.110***   4,697.220***   5,678.166***
##              (405.750)       (757.504)       (222.937)       (177.946)
##
## -----
## Observations           155           155           155           155
## R2                     0.307           0.474           0.519           0.521
## Adjusted R2            0.291           0.450           0.493           0.494
## F Statistic (df = 7; 147)   9.315***       18.927***       22.689***       22.855***
## =====
## Note:                                     *p<0.1; **p<0.05; ***p<0.01

```

## Confidence Intervals

```

##              2.5 %       97.5 %
## (Intercept)   5563.02482   7153.53529
## GDPq.gr       47.86708     655.24374
## L.unempl      -133.86537     90.39374
## L.cons.spend  -490.57144    129.86710
## L.ECB.MRO.ch -7666.78845   -1924.58844
## L.ECB.dep.ch  3940.45752    9275.10950
## L.WTI         -26.00505    106.13498
## L.Brent       -89.47599     51.61941

```

```

##              2.5 %       97.5 %
## (Intercept)  12012.42628  14981.7890
## GDPq.gr      732.85384   1866.7801
## L.unempl     -302.89418   115.7806
## L.cons.spend -208.25185   950.0599
## L.ECB.MRO.ch -6033.04040   4687.2124
## L.ECB.dep.ch 1414.08833   11373.4798
## L.WTI        14.86934    261.5648
## L.Brent     -276.43233   -13.0179

```

```

##              2.5 %       97.5 %
## (Intercept)  4260.2715838  5134.168474
## GDPq.gr      71.7546918   405.474323
## L.unempl     -102.4481007   20.769788
## L.cons.spend  -0.5641086   340.332300
## L.ECB.MRO.ch -92.5265759   3062.492403
## L.ECB.dep.ch -778.1502438   2152.943803
## L.WTI        -6.4213435    66.182240
## L.Brent     -72.4697245     5.054338

```

```

##              2.5 %       97.5 %

```

```
## (Intercept)    5329.397348  6026.93452
## GDPq.gr        162.822821   429.19503
## L.unempl       -62.516467    35.83502
## L.cons.spend  -136.148023   135.95263
## L.ECB.MRO.ch -3643.532898 -1125.22320
## L.ECB.dep.ch  2433.219509  4772.79420
## L.WTI          1.020521    58.97209
## L.Brent        -47.115291   14.76377
```

## Heteroscedasticity Diagnose

## Diagnose of non-normality of Errors

## Inferential Statistics - Panel Model: Fixed Effects

```
##
## =====
##                               Dependent variable:
##                               -----
##                               DAX      Nikkei      CAC      FTSE
##                               (1)      (2)      (3)      (4)
## -----
## GDP Growth                361.337**   1,349.303***  257.332***  303.629***
##                               (158.074)   (293.418)   (85.979)   (69.206)
##
## Unemployment lagged        -67.173    -246.569   -106.812**   -37.287
##                               (96.336)   (178.819)   (52.399)   (42.177)
##
## Consumption Spending lagged -194.559    384.571    166.552*     1.419
##                               (166.102)   (308.318)   (90.345)   (72.721)
##
## ECB MRO lagged            -4,777.314*** -567.379   1,523.881* -2,368.286***
##                               (1,483.946) (2,754.500) (807.139)   (649.685)
##
## ECB Depos. Facility lagged 6,569.872*** 6,210.280** 616.716     3,574.833***
##                               (1,379.990) (2,561.537) (750.596)   (604.172)
##
## WTI lagged                 39.866     137.279**   29.518     29.852**
##                               (34.138)   (63.367)   (18.568)   (14.946)
##
## Brent lagged               -18.603    -145.145** -33.658*    -16.227
##                               (36.465)   (67.686)   (19.834)   (15.965)
##
## -----
## Observations                155         155         155         155
## R2                          0.309         0.481         0.530         0.524
## Adjusted R2                 0.285         0.444         0.489         0.483
## F Statistic (df = 7; 143)   9.134***    18.959***    23.046***    22.485***
## =====
## Note:                       *p<0.1; **p<0.05; ***p<0.01
```

## Confidence Intervals

##	2.5 %	97.5 %
## GDPq.gr	51.51688	671.1572
## L.unempl	-255.98828	121.6418
## L.cons.spend	-520.11233	130.9936
## L.ECB.MRO.ch	-7685.79371	-1868.8334
## L.ECB.dep.ch	3865.14175	9274.6023
## L.WTI	-27.04405	106.7753
## L.Brent	-90.07327	52.8669

##	2.5 %	97.5 %
## GDPq.gr	774.21501	1924.39125
## L.unempl	-597.04732	103.90965
## L.cons.spend	-219.72051	988.86223
## L.ECB.MRO.ch	-5966.09997	4831.34099
## L.ECB.dep.ch	1189.75958	11230.79952
## L.WTI	13.08151	261.47697
## L.Brent	-277.80824	-12.48272

##	2.5 %	97.5 %
## GDPq.gr	88.816192	425.847306
## L.unempl	-209.510792	-4.112436
## L.cons.spend	-10.520755	343.624963
## L.ECB.MRO.ch	-58.082392	3105.844513
## L.ECB.dep.ch	-854.425482	2087.856539
## L.WTI	-6.874974	65.911261
## L.Brent	-72.531283	5.215894

##	2.5 %	97.5 %
## GDPq.gr	167.9864638	439.27066
## L.unempl	-119.9517051	45.37821
## L.cons.spend	-141.1107126	143.94942
## L.ECB.MRO.ch	-3641.6451499	-1094.92671
## L.ECB.dep.ch	2390.6776935	4758.98901
## L.WTI	0.5579295	59.14526
## L.Brent	-47.5177256	15.06279

## Heteroscedasticity Diagnose

### Diagnose of non-normality of Errors