Replication

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Applied Stats/March 23, 2024

Paper selected

(a) Research question: how parliamentary governments combine two commonly available strategies: economic manipulation before elections and opportunistic election timing to enhance their reelection chances

(b) Hypothesis 1 (H1): Complement; Governments use two strategies together to improve their chances in the upcoming election. If a government has the power to decide when to hold an election (opportunistic election timing), it will still manipulate the economy.

Hypothesis 2 (H2): Substitution; This hypothesis proposes that governments use one strategy in place of the other. If a government can time elections, it will manipulate the economy less than governments that cannot choose when to have elections.

(c) $\text{Consumption to Investment}_{i,t} = \beta_1 \text{Electoral Cycle}_{i,t} + \beta_2 \text{Dissolution Powers}_{i,t} + \beta_3(\text{Electoral Cycle}_{i,t} \times \text{Dissolution Powers}_{i,t}) + \sum_{k=1}^{K} \gamma_k X_{k,i,t} + h_t + \varepsilon_{i,t}$;

(d) Beckman, T., Schleiter, P. (2020). Opportunistic Election Timing, a Complement or Substitute for Economic Manipulation? The Journal of Politics, 82, 1127 - 1141.

`https://content.ebscohost.com/cds/retrieve?content=AQICAHiylJ_bvOB56hI8UzTN6Ryruh7a`
`ANwtaWYjmxwEe-p4VqQama6z3YQLIsnKaAAAA4jCB3wYJKoZIhvcNAQcGoIHRMIHOAgEAMIHIBgkqhkiG9w`
`Y7RhkQEXLZQPUsUq7VPjhyVCv8KaOMSxrgeFWi8En944yOW2JnxsZsLEaIKyO4QFEgyZkcmVyJsxPOUdqNb`
`V3y7GvYjwtOW8Tda1FqwrVvMwlDUjs=`

(a) Finding 1: In all models, the Electoral Cycle is positive and significant, implying that the closer it gets to an election, the more the government spends on consumption relative to investment. The Dissolution Powers variable is consistently negative when interacting with the Electoral Cycle, indicating that the higher the dissolution powers, the less the government engages in fiscal manipulation as the elections approach. With higher dissolution powers, which give them the flexibility to call elections, are less likely to manipulate the economy (lower consumption-to-investment ratio). This finding supports Hypothesis 2 and refuses Hypothesis 1, suggesting that incumbents do not complement economic manipulation with election timing; instead, they substitute one strategy for the other.

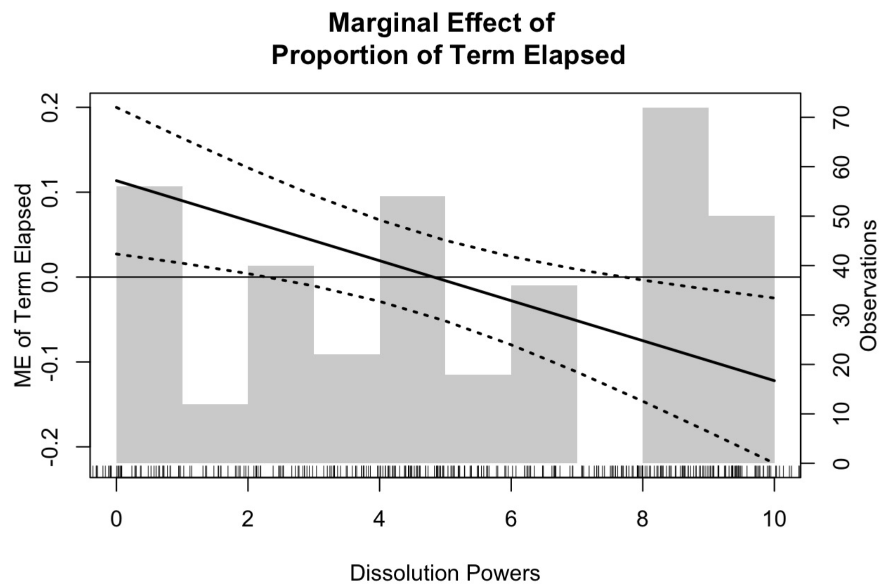
	Dependent Variable: Consumption to Investment (Log)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Consumption to investment (lag)	.878***	.874***	.447***	.419***	.906***	.909***	.499***	.473***
	(.029)	(.030)	(.090)	(.100)	(.018)	(.015)	(.102)	(.103)
Electoral cycle	.110**	.107**	.084***	.089***	.116**	.111**	.089**	.094***
	(.045)	(.053)	(.031)	(.032)	(.046)	(.055)	(.039)	(.033)
Dissolution powers	.013**	.012**	.024**	.025*	.012**	.011*	.017**	.017**
	(.006)	(.006)	(.011)	(.013)	(.006)	(.006)	(.008)	(.008)
Electoral cycle × dissolution powers	−.023***	−.023***	−.018***	−.017*	−.024***	−.024***	−.019***	−.019*
	(.008)	(.008)	(.006)	(.006)	(.008)	(.008)	(.007)	(.006)
GDP growth	−.022***	−.011***	−.011***	−.029***	−.021***	−.012***	−.014***	−.030***
	(.004)	(.003)	(.002)	(.006)	(.004)	(.003)	(.004)	(.008)
GDP (log)	−.004	−.005	−.081	−.162				
	(.010)	(.010)	(.071)	(.136)				
Inflation	−.002**	−.001	.002	.003				
	(.001)	(.001)	(.002)	(.003)				
Revenue	−.004**	−.003	−.003	−.012				
	(.002)	(.002)	(.009)	(.009)				
Debt to GDP	.001	.001	.003***	.002**				
	(.001)	(.001)	(.001)	(.001)				
Vote share	.003***	.003***	.003	.003				
	(.001)	(.001)	(.002)	(.002)				
Government fractionalization	.199**	.175**	.168	.208*				
	(.087)	(.081)	(.130)	(.116)				
Constant		.308				.119**		
		(.224)				(.059)		
Country fixed effects	X	X	✓	✓	X	X	✓	✓
Year fixed effects	✓	X	X	✓	✓	X	X	✓
Time trend (cubic)	X	✓	✓	X	X	✓	✓	X
Observations	360	360	360	360	360	360	360	360
R^2	.861	.853	.370	.402	.857	.848	.331	.367
Adjusted R^2	.849	.847	.302	.308	.847	.844	.273	.282

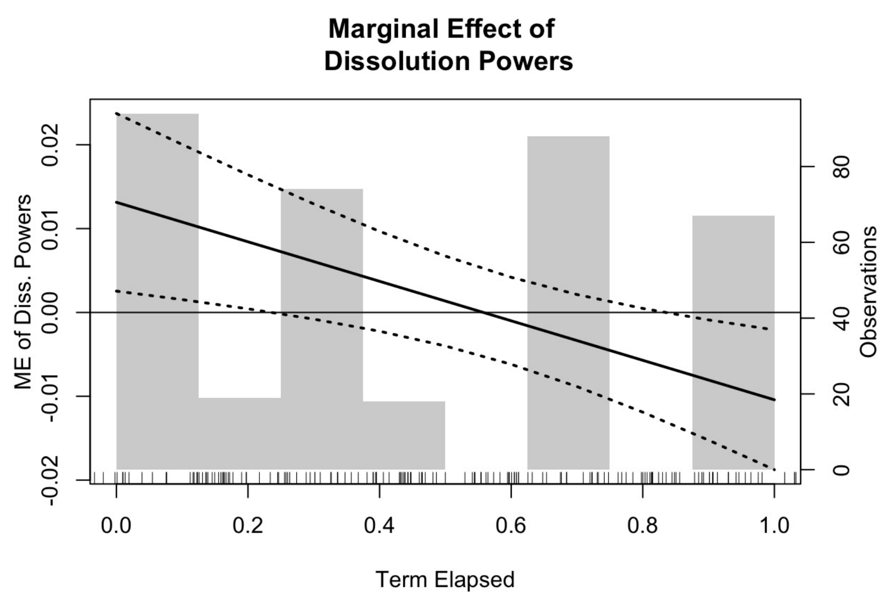
```r
### imputation on the dataset: account for the structure of the data
    across time and between countries
set.seed(1234)

data_imp <- amelia(x = data, m=10, ts= "Year",
```

```r
                    cs="country",ords=c('execrlc','eu','single_party','dem_age',
                                            'BBR','DR','legislative_type'), polytime = 3)
### defines imp_fun function for running panel regressions, initializes containers for coefficients, standard errors, and R-squared values

imp_fun <- function(form=y~x, mod='within',eff='time',data){ # note dat is changed

  b_out1 <- NULL # Ests
  se_out1 <- NULL # SEs
  r_square1 <- NULL # R2
  adj_r_square1 <-NULL # Adj R2

  for(i in 1:data$m){
    imp_data <- data$imputations[[i]]
    # Cubic polynomial to account for trend
    imp_data$t <- imp_data$Year - min(as.numeric(paste(imp_data$Year)))
    imp_data$t2 <- imp_data$t^2
    imp_data$t3 <- imp_data$t^3


    mod1 <- plm(form,model=mod, effect = eff,index=c('country','Year'), data=imp_data)

    se1 <-coeftest(mod1, vcov=vcovHC(mod1,cluster="group"))
    b_out1 <- rbind(b_out1, mod1$coef)
    se_out1 <- rbind(se_out1, se1[,2])
    r_square1 <- rbind(r_square1, summary(mod1)$r.square[1])
    adj_r_square1 <- rbind(adj_r_square1, summary(mod1)$r.square[2])
  }


  # Combine results from imputations
  combined_results1 <- mi.meld(q=b_out1, se=se_out1)
  # Get z scores
  mi_z1 <- combined_results1$q.mi/combined_results1$se.mi
  # Get p-values
  mi_p1 <- 2*(1 - pnorm(abs(mi_z1)))
  # Combine the above (minus z-score)
  combined_final1 <- cbind(t(round(combined_results1$q.mi,3)), t(round(combined_results1$se.mi,3)), round(t(mi_p1),4))
  colnames(combined_final1) <- c("EST", "SE", "P")

  r2 <- sum(r_square1)/length(r_square1)
  adj_r2 <- sum(adj_r_square1)/length(adj_r_square1)


  return(list(combined_final1,r2,adj_r2, nrow(imp_data)))

```

```r
}
### MODELS 1 - 8, Tables printed out in LaTeX form (for comparison)

mod1_imp <- imp_fun(log_con_inv~lag(log_con_inv)+prop_elapsed*max_pm_gov_leg+
                        change_GDP+log_gdp_dol+inflation+revenue+gross_debt+
                        vote_share+govfrac,
                      mod="within",eff="time",data=data_imp)
#.....
mod8_imp <- imp_fun(log_con_inv~lag(log_con_inv)+prop_elapsed*max_pm_gov_leg+
                        change_GDP, mod="within",eff="twoways",data=data_imp)
### Make baseline, non imputed, models, replace coefficients, Add cubic polynomial to baseline data
data2 <- data
data2$t <- data2$Year - min(as.numeric(paste(data2$Year)))
data2$t2 <- data2$t^2
data2$t3 <- data2$t^3

mod1_base <- plm(log_con_inv~lag(log_con_inv)+prop_elapsed*max_pm_gov_leg+change_GDP+log_gdp_dol+inflation+revenue+gross_debt+vote_share+govfrac,index=c("country","Year"), model="within",effect="time", data=data2)
#....
mod8_base <- plm(log_con_inv~lag(log_con_inv)+prop_elapsed*max_pm_gov_leg+change_GDP, model="within",effect="twoways",index=c("country","Year"), data=data2)


### Use stargazer with the manually extracted coefficients, standard errors, and add R^2 and Adjusted R^2
stargazer(models_list, type = "latex",
          coef=list(coefs[[1]], coefs[[2]], coefs[[3]], coefs[[4]], coefs[[5]], coefs[[6]], coefs[[7]], coefs[[8]]),
          se=list(ses[[1]], ses[[2]], ses[[3]], ses[[4]], ses[[5]], ses[[6]], ses[[7]], ses[[8]]),
          covariate.labels = c("Lagged Consumption to Investment (Log)", "Electoral Cycle", "Dissolution Powers",
                               "GDP Growth", "GDP (Log)", "Inflation", "Revenue", "Debt to GDP", "Vote Share", "Government Fraction",
                               "Time", "Time Squared", "Time Cubed", "Electoral Cycle times Dissolution Powers"),
          add.lines = list(c("R-squared", r_squared), c("Adjusted R-squared", adj_r_squared)),
          omit.stat = c("rsq", "f", "ser"), # Since we are manually adding R^2 and Adjusted R^2
          out = "model_summary2_table.tex")
```

(b) Finding 2 the 2 figures below suggest that governments with higher dissolution powers may engage in less economic manipulation as the electoral term progresses, which is consistent with the substitution hypothesis that incumbents with opportunistic powers might rely more on election timing than economic manipulation.





```
# Figure 1

hist(data2$max_pm_gov_leg, xlab=NULL, ylab=NULL, col = "light gray"
      ,lty=0, axes = F, main=NULL)
axis(4) # Put labels on right of plot
mtext("Observations", side=4, line=2)
rug(jitter(data2$max_pm_gov_leg, amount=1)) #rugplot
par(new=TRUE) # To overlap ME plot on histogram

plot(c(min(DP), max(DP)), c(min(lower1), max(upper1)), xlab="Dissolution Powers",
      ylab="", main="Marginal Effect of \n Proportion of Term Elapsed", type="n") # type="n" removes points
lines(DP, combined_1$q.mi, lwd=2)
lines(DP, lower1, lty = 3, lwd=2) # lwd makes lines thicker
lines(DP, upper1, lty = 3, lwd=2)
mtext("ME of Term Elapsed", side=2, line=2)
abline(h=0)


# Figure2
hist(data2$prop_elapsed, xlab=NULL, ylab=NULL, col = "light gray"
      ,lty=0, axes = F, main=NULL)
axis(4) # Put labels on right of plot
mtext("Observations", side=4, line=2)
rug(jitter(data2$prop_elapsed, amount=1)) #rugplot
par(new=TRUE) # To overlap ME plot on histogram

plot(c(min(E), max(E)), c(min(lower2), max(upper2)), xlab="Term Elapsed",
      ylab="", main="Marginal Effect of \n Dissolution Powers", type="n") # type="n" removes points
lines(E, combined_2$q.mi, lwd=2)
lines(E, lower2, lty = 3, lwd=2) # lwd makes lines thicker
lines(E, upper2, lty = 3, lwd=2)
mtext("ME of Diss. Powers", side=2, line=2)
abline(h=0)
```

Extension

(a) Research question: what is the most significant factor that leads to economic manipulation?

(b) Hypothesis: Economic manipulation is associated with economic downturns, whether the government is run by a single party do not directly cause economic manipulation.

(c) $\text{Logit}(\text{Economic\_Manipulation}) = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1(\text{change\_GDP}) + \beta_2(\text{single\_party}) + \beta_3(\text{Year}) + \beta_4(\text{inflation}) + \beta_5(\text{revenue}) + \epsilon$

(d) Dependant variable: Logit(Economic Manipulation) Calculation of Year-over-Year Change in Logarithmic Consumption Investment, indicate economic manipulation through investment fluctuations.

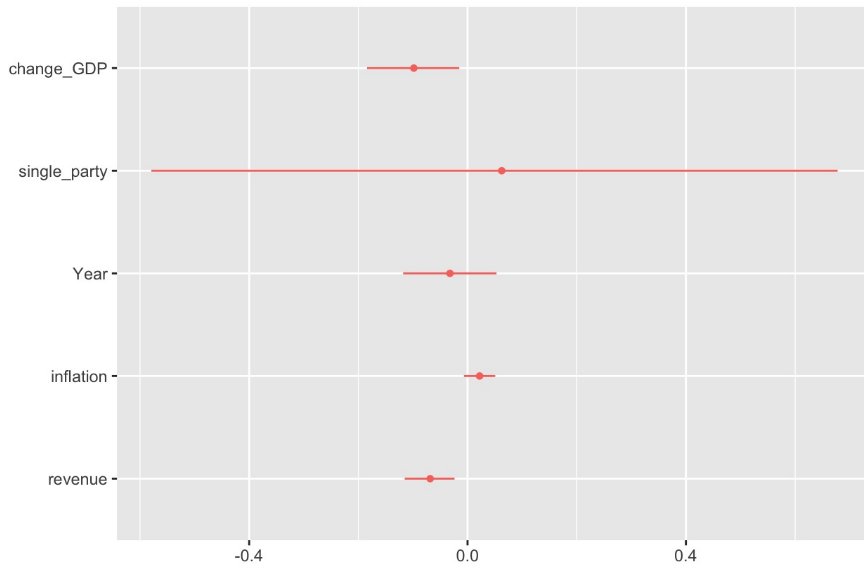
Threshold of significant Economic Manipulation based on above the third quartile (0.75) of changes in the year-over-year log-con-inv.

Then creates a binary variable that marks instances of significant economic manipulation (1 if the change is in the top quartile, 0 otherwise)

```r
# Calculate year-over-year change in log_con_inv
data <- data %>%
  group_by(country) %>%
  mutate(delta_log_con_inv = log_con_inv - lag(log_con_inv))

# Define significant economic manipulation as top quartile of changes
threshold <- quantile(data$delta_log_con_inv, 0.75, na.rm = TRUE)

# Create a binary variable for significant economic manipulation
data$Economic_Manipulation <- ifelse(data$delta_log_con_inv >= threshold,
    1, 0)


# Fit the logistic regression model to the entire dataset
model_logi <- glm(Economic_Manipulation ~ change_GDP + single_party +
    prop_elapsed + Year + inflation + revenue,
                  data = data, family = "binomial")
summary(model_logi)
```

```
Coefficients:
              Estimate Std. Error z value Pr(>|z|)
(Intercept)   64.76035   86.37837   0.750  0.45342
change-GDP    -0.09838    0.04277  -2.300  0.02144 *
single-party   0.06259    0.31953   0.196  0.84469
Year          -0.03226    0.04350  -0.742  0.45834
inflation      0.02207    0.01461   1.510  0.13100
revenue       -0.06850    0.02322  -2.949  0.00318 **
```

```r
# draw a dot-and-whisker plot
dwplot(model_logi)
```

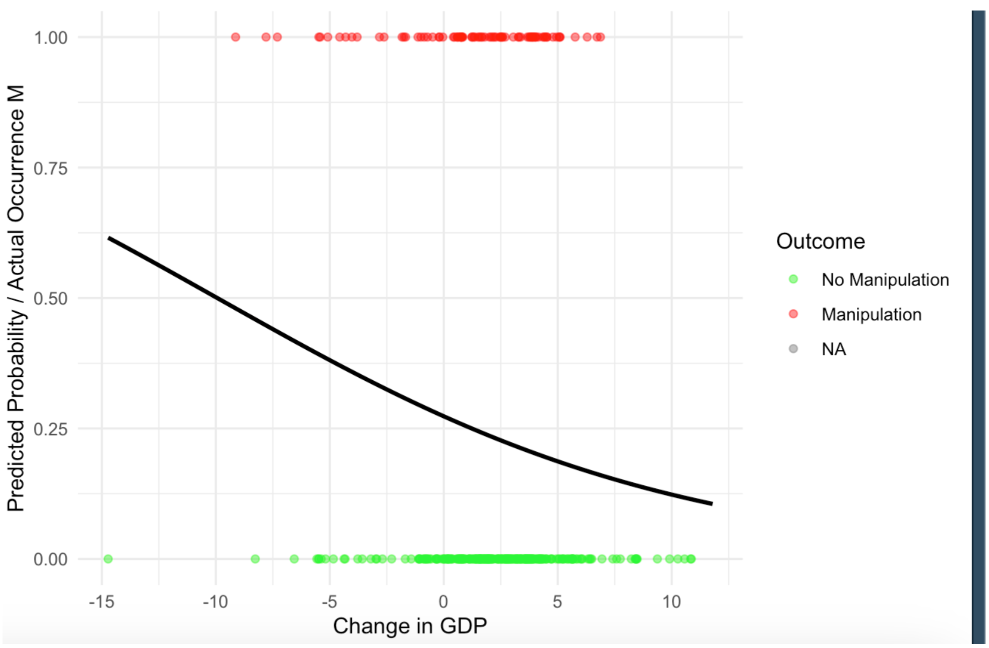


(a) The estimated coefficient of change-GDP is -0.09838. This negative coefficient suggests that a decrease in GDP change, which may signal an economic downturn, is associated with an increase in the log odds of observing significant economic manipulation. A one-unit increase in change- GDP is associated with a 9.4%($e^{-0.09838}$) decrease in the likelihood of significant economic manipulation because the coefficient is negative. The P-value of 0.02144 indicates a statistically significant negative correlation between the change in GDP and the occurrence of significant economic manipulation.

The estimated coefficient for single-party is 0.06259 and a p-value of 0.84469. This large p-value indicates that the presence of a single-party government is not a statistically significant predictor of economic manipulation in this model.

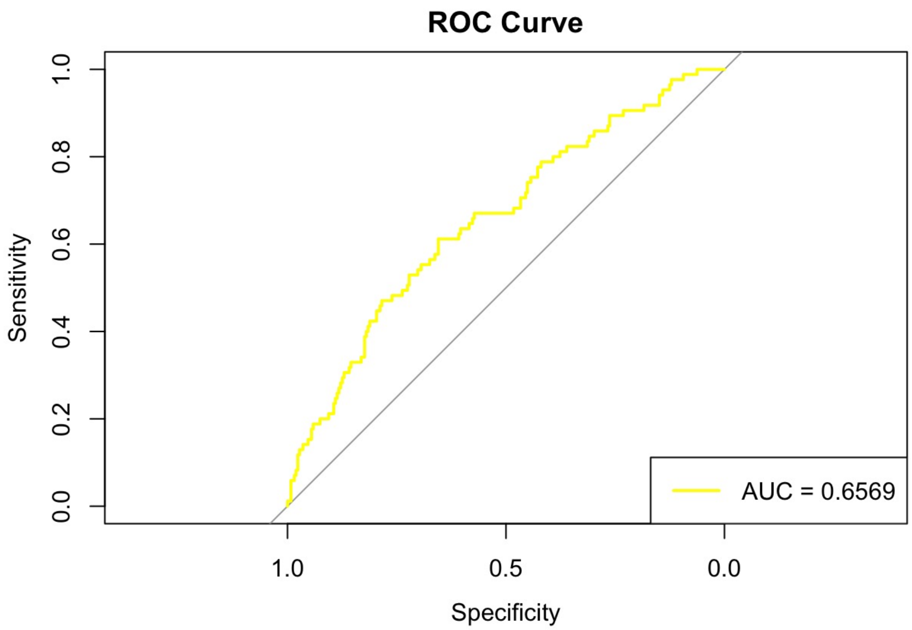
In the dot and whisker plot: a whisker crossing the zero line in a confidence interval plot indicates there is not sufficient evidence to prove that the effect is different from zero and considers it not statistically significant at the 5% level.

```r
# create a new data frame with the values to predict probabilities
newdata <- data.frame(change_GDP = seq(min(data$change_GDP), max(data$change_GDP), length.out = 100),
                      single_party = mean(data$single_party),
                      Year = mean(data$Year),
                      inflation = mean(data$inflation),
                      revenue = mean(data$revenue))

# predict probabilities
newdata$predicted_prob <- predict(model_logi, newdata = newdata, type = "response")

# create the plot
ggplot(newdata, aes(x = change_GDP, y = predicted_prob)) +
  geom_line() +
  labs(x = "Change in GDP", y = "Predicted Probability of Economic Manipulation")

plot <- ggplot() +
  geom_line(data = newdata, aes(x = change_GDP, y = predicted_prob), size = 1) + # Plot the predicted probabilities
  geom_point(data = data, aes(x = change_GDP, y = Economic_Manipulation, color = as.factor(Economic_Manipulation)), alpha = 0.5) + # Add the actual data points
  scale_color_manual(values = c("green", "red"), labels = c("non-occurrences", "occurrences of manipulation ")) +
  labs(x = "Change in GDP", y = "Predicted Probability Manipulation", color = "Outcome") +
  theme_minimal()
```



(a) The black line, which shows the predicted probabilities of economic manipulation, should ideally align with the actual outcomes. If the model fits well; The descending line indicates that higher GDP change is associated with lower probabilities of manipulation. Most of the green points are at the higher end of GDP change, which aligns with the model's predictions.

```r
# Generate the ROC curve and calculate the AUC
roc_curve <- roc(data$Economic_Manipulation, predicted_probs)
auc_value <- auc(roc_curve)

# Plot the ROC curve
plot(roc_curve, main="ROC Curve", col="yellow", lwd=2)

# Add the AUC to the plot
auc_value <- auc(roc_curve)
legend("bottomright", legend=paste("AUC =", round(auc_value, 4)), box.lty=1, col="yellow", lwd=2)
```



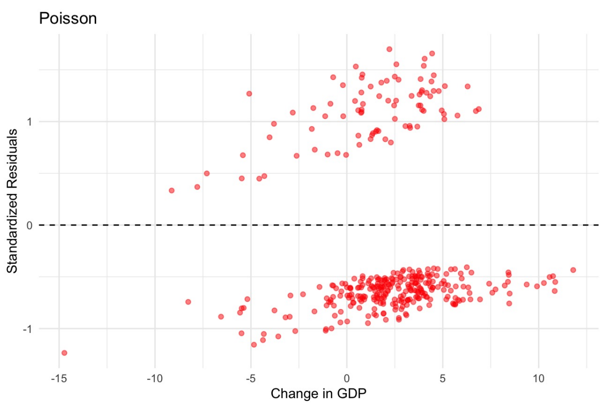
(b) AUC score of 0.6569 is better than 0.5, the model can identify economic manipulation better than by random (moderate accuracy) , but there's room for improvement

```r
# Fit the Poisson regression model to the entire dataset

manipulation_count <- data %>%
    group_by(country, Year) %>%
  summarise(manipulation_count = sum(Economic_Manipulation, na.rm = TRUE)) %>%
  ungroup()
data <- merge(data, manipulation_count, by = c("country", "Year"))

model_pois <- glm(manipulation_count ~ change_GDP + single_party + Year +
    inflation + revenue,
                  data = data, family = "poisson")

summary(model_pois)

# Calculate the standardized residuals
data$std_residuals <- rstandard(model_pois)

# Create the residual plot
ggplot(data, aes(x = change_GDP, y = std_residuals)) +
  geom_point(alpha = 0.5, color="red") +  # Use alpha to make points semi-
    transparent if there are many
  geom_hline(yintercept = 0, linetype = "dashed") +
  labs(title = "Poisson", x = "Change in GDP", y = "Standardized Residuals") +
  theme_minimal()
```

```
Coefficients:
              Estimate Std. Error z value Pr(>|z|)
(Intercept)   6.205242  70.374296   0.088  0.92974
change_GDP   -0.061445   0.032417  -1.895  0.05803.
single_party  0.053297   0.260506   0.205  0.83789
Year         -0.003348   0.035436  -0.094  0.92473
inflation     0.014914   0.011800   1.264  0.20626
revenue      -0.050677   0.019480  -2.602  0.00928 **
---
```

Economic growth (increase in GDP) and higher government revenue are associated with fewer economic manipulations. However, only the effect of revenue is statistically significant at conventional levels.

```r
# Create the residual plot poisson
ggplot(data, aes(x = change_GDP, y = std_residuals)) +
  geom_point(alpha = 0.5, color="red") +
  geom_hline(yintercept = 0, linetype = "dashed") +
  labs(title = "Poisson", x = "Change in GDP", y = "Standardized Residuals") +
  theme_minimal()

 # Create the residual plot logistic
ggplot(fitted_data, aes(x = change_GDP, y = std_residuals_logi)) +
  geom_point(alpha = 0.5, color = "blue") +
  geom_hline(yintercept = 0, linetype = "dashed") +
  labs(title = "Logistic Regression", x = "Change in GDP", y = "Standardized
    Residuals") +
  theme_minimal()
```



The logistic regression residuals appear to be more evenly distributed around the zero line than the Poisson regression residuals. This suggests that the logistic regression may be a better fit for the data as the dependent variable is binary.

The spread of the residuals in the Poisson plot indicates potential problems with the model's fit, possibly due to overdispersion. This is when the variance is greater than the mean. (The Poisson model assumes the mean and variance are equal) so Poisson may not be the best choice.

Conclusion: Based on the statistics from the previous logistic regression model summary, we can determine the hypothesis of the extended research question is true: Economic manipulation is associated with economic downturns, whether the government is run by a single party does not directly cause economic manipulation. Economic factors like revenue and GDP change lead to economic manipulation majorly.