

Electoral Reform and Pork Barrel in Parliamentary Questions

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Research Questions



- Measuring legislator behaviours and tendencies towards constituencies under different electoral systems is important.
- In this paper, I quantitatively investigate legislators' pork-barrel behavior on **parliamentary questions** using the case of Taiwan Legislative Yuan.
- Research Questions:
 1. Are the legislators in insingle non-transferable vote system (SNTV) more likely to ask more about **the provision of particularistic goods** in the parliamentary questions?
 2. Dose the reform change legislators' electoral strategies and behaviours?

Implication of PQs



- Parliamentary activities such as **debates** (**Parspeech V2**) and **parliamentary questions** play a significant role in most parliamentary democracies.
- The advantages for focusing on parliamentary questions:
 1. The party leadership have less control over MP's motivation to employ parliamentary questions (Judge 1974, Shane 2011).
 2. Parliamentary questions may reveal MPs' interests in policy preference (Shane 2011).

Implication of PQs



- MPs ask questions for several reasons.
 1. Because of their **expertise** or domain responsibility of delegation for question topics.
 2. personal preference such as their nature of **substantive representation** (Russo 2021; Saalfeld 2011; Martin 2011)
 3. electoral motivation: **personal reputation** (Martin 2011)
 4. electoral rule and systems.

Implication of PQs



- In this paper, I introduce the case of **Taiwan Legislative Yuan**, where the electoral system reformed through SNTV to SMD, to evaluate how electoral motives shape legislators' tendency to pork-barrel projects under different electoral systems.
- In particular, parliamentary questions are the primary channel for legislators to **scrutinize the government** and **express political intentions**.
- These parliamentary questions allow identification of different **question topics**, **categories** and **further information** regarding **legislators' opinions of policy interests** and agenda at the individual level.

Background



- The SNTV-MMD was the major system to elect legislators before 2008 in Taiwan.
- This was thought to intensify majority-seeking parties to run more than one candidate in a district, which increases incentives for candidates to run on personal votes against their party reputation.



- The SNTV in Taiwan was criticized for creating **excessive intra-party chaos and competition** (Cox 1990; Hirano 2006; Ames 2001), as well as **encouraging factional and candidate-centered electoral politics** (e.g. Batto and Huang 2016; Wu 2003).

The Literature: Personal Votes



- The electoral system such as SNTV-MMD, which combines plurality rule with a single vote per voter and a district magnitude larger than one, was believed to **increase intra-party (centrifugal) competition** (Cox 1990; Carey and Shugart 1995).
- Under the SNTV-MMD, parties or party leaders have incentive to nominate more than one candidate to run in each district, which required their **candidates to compete against each other**.
- Therefore, co-partisan candidates cannot rely exclusively on their party reputation and have to find an alternative means of attracting votes by **running on a personal reputation** via providing paricularistic services as called “personal vote” (Cain, Ferejohn, and Fiorina 1987; Reed 1994; Carey and Shugart 1995).

The Literature: Pork Barrel Politics



- An examination of the relationship between electoral systems and the “pork-barrel” phenomenon is being investigated in light of the explosion of interest in the past decade in **the effects of different electoral systems** on policy outputs (e.g., Hirano 2005; Samuels 2002; Stratmann and Baur 2002; Lancaster and Patterson 1990; Lancaster 1986).
- The literature focusing on Taiwan distributive politics has investigated the effects of the electoral reform that **decreases legislators' incentive to bring home the bacon**.
- For example, Sheng (2014a) and Sheng (2014b) investigate the impacts of electoral reform on changes of bill sponsorship with regards to particularistic goods among legislators. Luor and Hsieh (2008) and Luor and Liao (2009) focus on the impact of district magnitude on legislators' incentive to propose pork barrel-related bills.
- In similar, Catalinac (2016) finds that LDP (Liberal Democratic Party) candidates under the SMDs in Japan adopted new electoral strategies by mentioning programmatic policies such as national security.

Parliamentary Questions



- In order to analyze parliamentary questions, I have webscraped the parliamentary questions from the official website of Taiwan Legislative Yuan from 1993 to 2020, including the relevant information about the classified topics, selected keywords and the corresponding question type.

丁守中

8 7 6 4 3 2 1 ALL

基本資料 閩政成果

詳細資料 第1/366筆 回查詢 下一筆 列印 存檔

質詢委員 丁守中 legislator

質詢性質 預決算質詢 question type

質詢 立法院第7屆第7會期第12次會議 100年05月10日 100卷037期一冊3889號0341-0345頁 PDF

案由 行政院院長、主計長、財政部長列席報告100年度中央政府總預算追加預算案編製經過，並備質詢。the purpose

答復否 已答

答復 立法院第7屆第7會期第12次會議 100年05月10日 100卷037期一冊3889號0341-0345頁 口頭答復 PDF

答復人 吳敦義 李述德 吳清基

質詢日期 1000510 date

答復日期 1000510

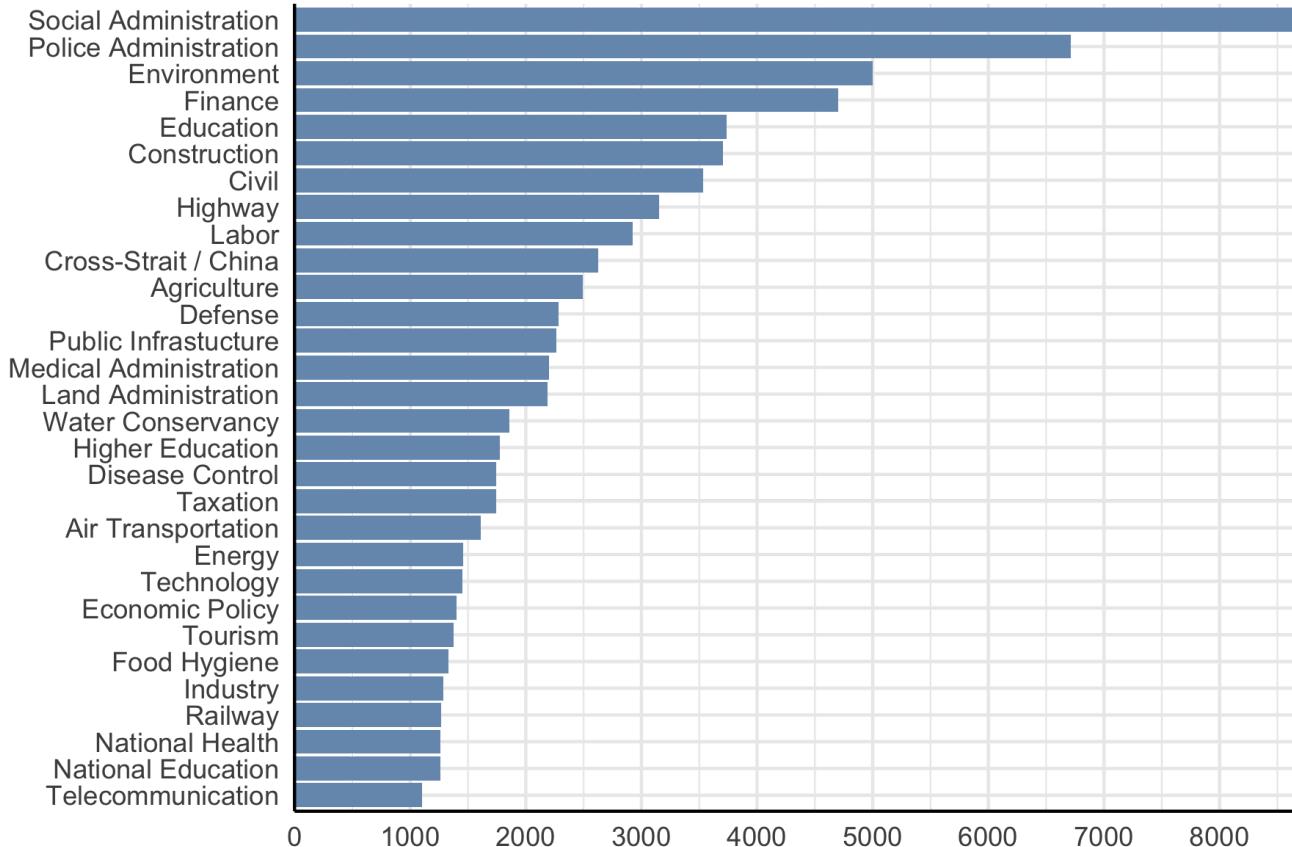
系統號 205510

類別 營建；賦稅；教育政務；水利 categories

主題 房價；課稅；水資源；教育人員俸給 types

關鍵詞 土地增值税；財產交易所得稅；奢侈稅；大專院校教授薪資；節水；廢水回收再利用；抗旱 Keywords

Parliamentary Questions

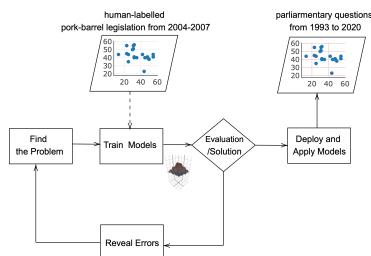


Research Design



Training Deep Learning Model

- Existing labelled pork legislation
- Train a deep learning model to measure pork-barrel features on parliamentary questions over time.



Regression

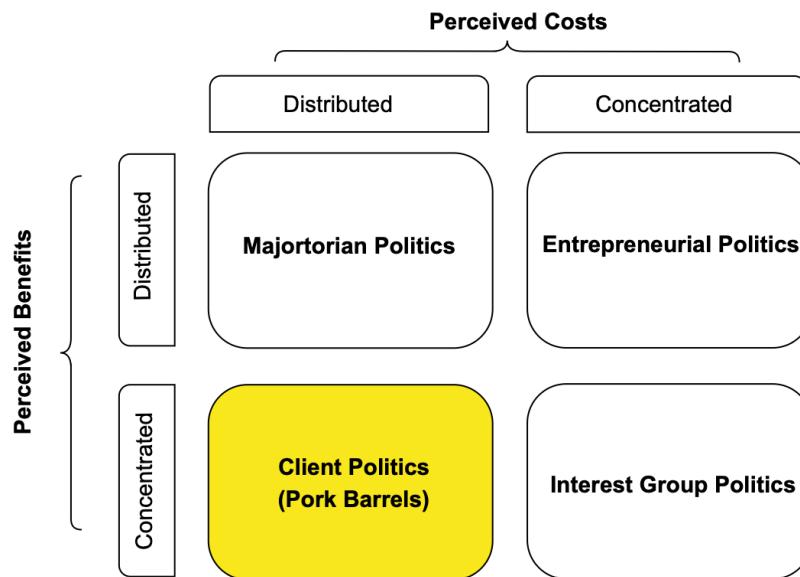
- DiD Desgin X
- Regression analyses are employed to answer the research questions.



Training Data

Training Data: Pork-barrel Legislation

- The classification of these bills is typically based on the nature of the associated costs (distributed vs concentrated) and associated benefits (distributed vs concentrated).



Source: Wilson and Dilulio (2001)

Training Data



An Example of Pork Barrel Legislation

立法院第 6 屆第 5 會期第 6 次會議議案關係文書

立法院議案關係文書 (中華民國41年9月起編號)
中華民國96年3月28日印發

院總第 1687 號 委員提案第 7375 號

the purpose of statute

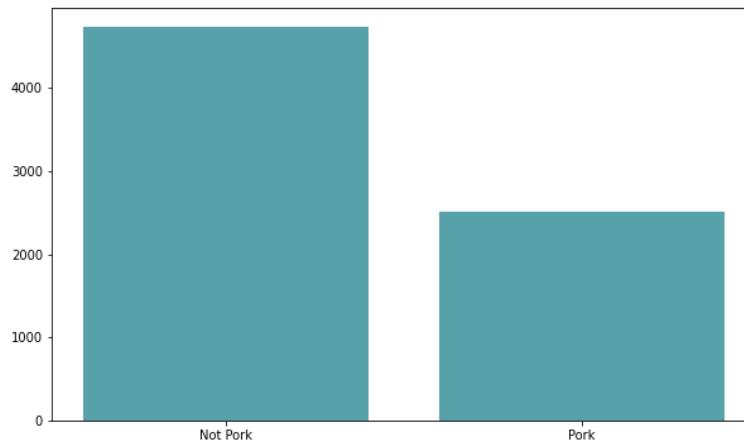
案由：本院委員林重謨、蔡啟芳、侯水盛、潘孟安、盧天麟、高建智、余政道、唐碧娥等 40 人，有鑑於最低基本工資可視為人民維持基本生活水準之意涵，現行每月僅有五千元的老年農民福利津貼相較於一萬五千八百四十元之法定基本工資，實已偏低，不但無法維持老年農民基本生活需求，亦與老年農民長期對國家的貢獻不成正比，更有違政府落實照顧農民的承諾，再加上近年來物價年年高漲，使老年農民生活的艱苦更加雪上加霜。職是之故，基於保障老年農民基本生活水準
in light of the contribution made by the farmers
，肯定老年農民之貢獻並提昇其生活品質，特擬具「老年農民福利津貼暫行條例第四條修正案」，比照國內法定基本工資之標準，將現行老年農民福利津貼發放金額由每月五千元提高至每月一萬五千元。是否有當，敬請公決。
to NTD 15000



Training Data

Number of Train/ Test Splits

- The collection of this data set consists of 7243 pieces of legislation which were annotated as Pork (with label 1) or Non-Pork (with label 0).

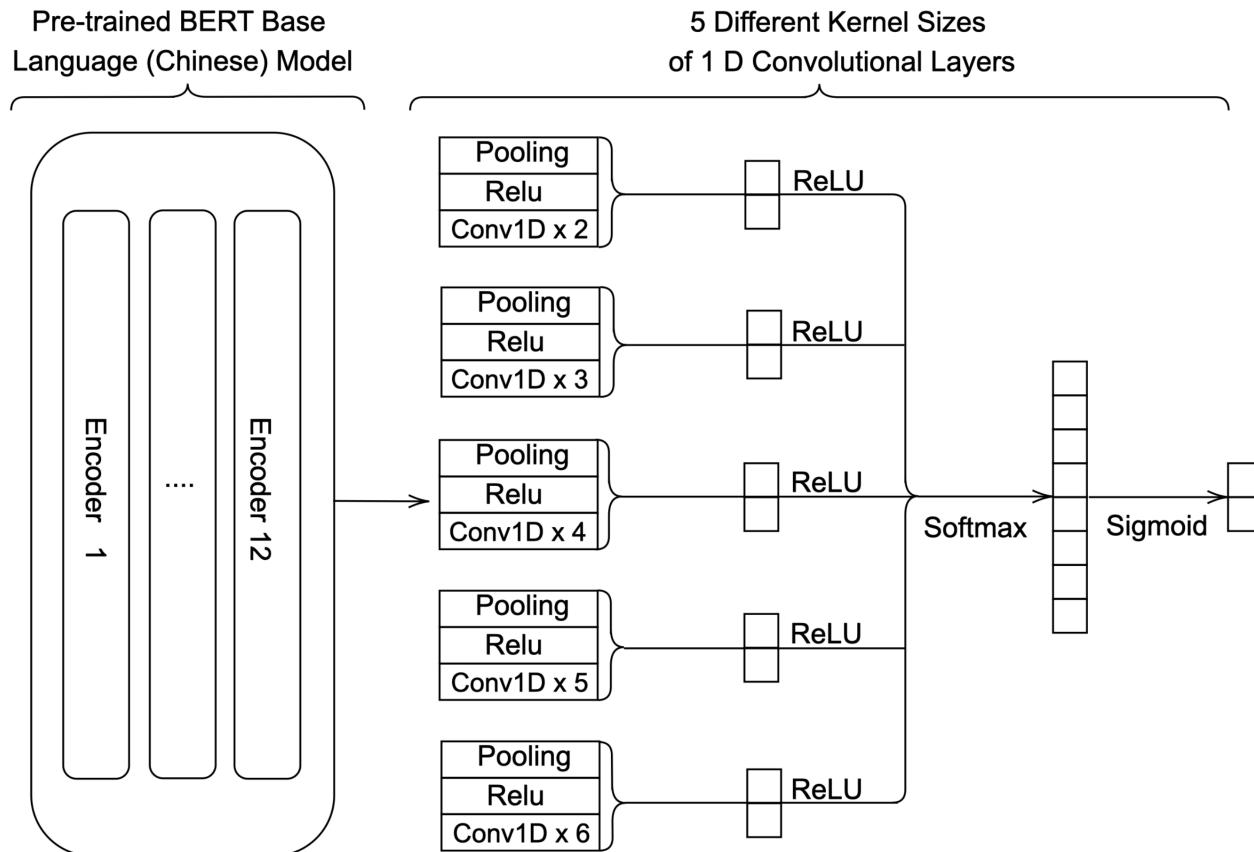


- This dataset was cross-coded by three researchers to perform its validity, which achieves 98% in terms of consistency and preciseness among coders.

Declaring DL Model



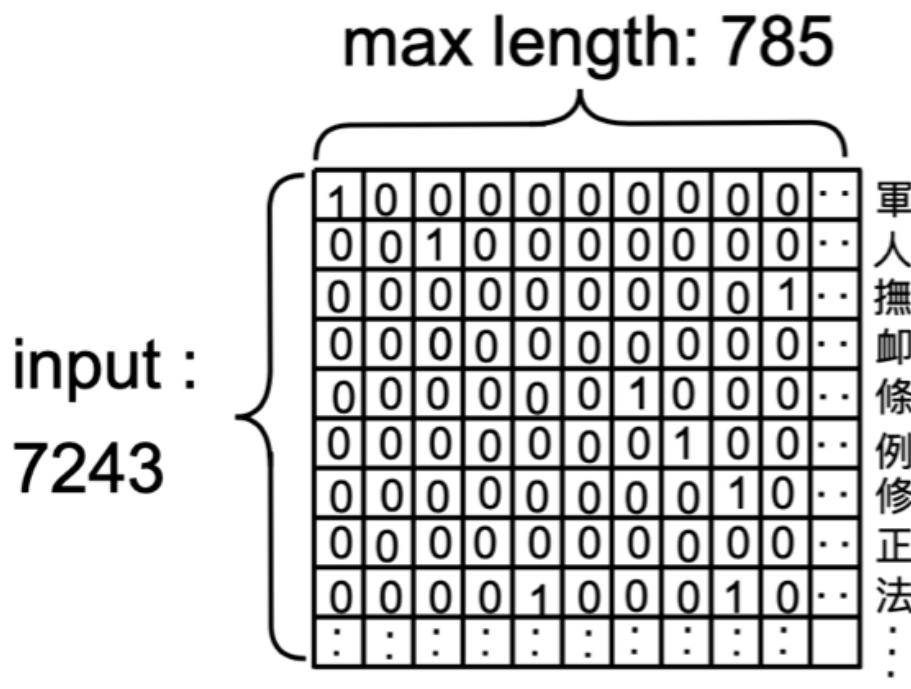
BERT Layers + Convolutional Neural Nets



Declaring DL Model



One-hot Encoding



Declaring DL Model



Static Embedding Vectors

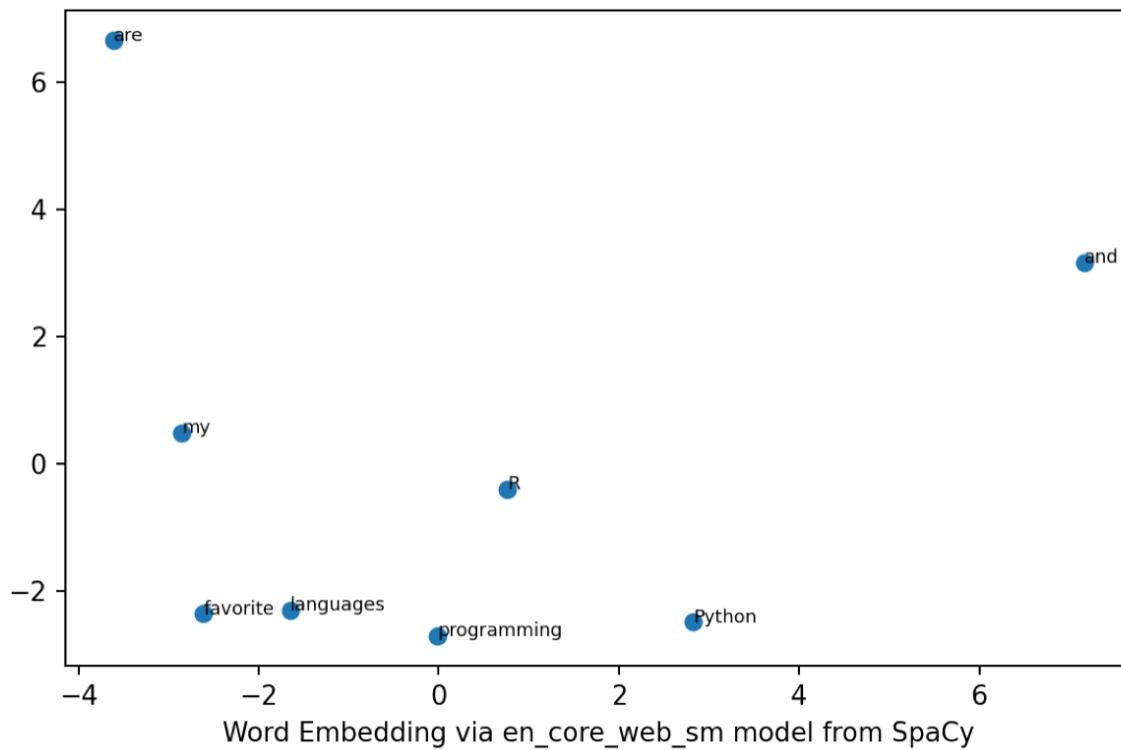
```
nlp = spacy.load("en_core_web_sm")
vocab = nlp("R and Python are my favorite programming languages")
words = [word.text for word in vocab]
vecs = np.vstack([word.vector for word in vocab if word.has_vector])
pca = PCA(n_components=2)
vecs_transformed = pca.fit_transform(vecs)
```

```
plt.figure(figsize=(10, 7))
plt.scatter(vecs_transformed[:,0], vecs_transformed[:,1])
for word, coord in zip(words, vecs_transformed):
    x, y = coord
    plt.text(x, y, word, size=7)
plt.xlabel("Word Embedding via en_core_web_sm model from SpaCy")
plt.show()
```

Declaring DL Model



Static Embedding Vectors



Declaring DL Model



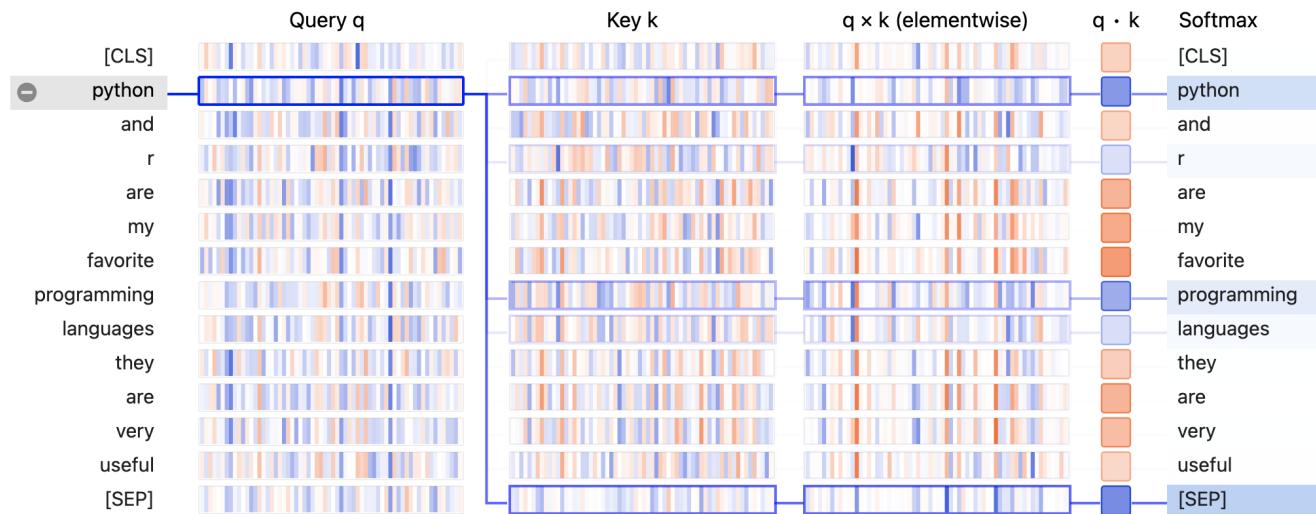
Contexted-based BERT Embedding

```
from transformers import AutoTokenizer
from bertviz.transformers_neuron_view import BertModel
from bertviz.neuron_view import show
tokenizer = AutoTokenizer.from_pretrained("bert-base-uncased")
model = BertModel.from_pretrained("bert-base-uncased")
text = "R and Python are my favorite programming languages [SEP] Python is a snake"
show(model, "bert", tokenizer, text, display_mode="light", layer=0, head=8)
```

Declaring DL Model



Contexted-based BERT Embedding



Performances



Table 2: The Performance of CNN, BERT and CNN-BERT

	Text CNN			BERT			CNN-BERT		
	Precision	Recall	F1-score	Precision	Recall	F1-score	Precision	Recall	F1-score
Non Pork	0.95	0.97	0.96	0.96	0.97	0.97	—	—	—
Pork	0.94	0.91	0.92	0.95	0.93	0.94	—	—	—
Accuracy			0.95	0.96		0.96	—	—	—
Macro Avg	0.95	0.94	0.94	0.96	0.95	0.95	—	—	—
Weighted avg.	0.95	0.95	0.95	0.96	0.96	0.96	—	—	—

Note: EarlyStop function with patience = 5 from Tensorflow is used to monitor the performance of the training process, which the model stops when there is no improvement within five epochs. Text CNN model was trained until 13 epochs while generic BERT model finished at 12 epochs with learning rate 1e-08. CNN-BERT is still computing in HPC with 2000 epochs and is temporarily not available.

Pork Featured



Legislator	Questions	Topics	Keywords
陳啟昱	鑑於現行《所得稅法》第十.	Income tax; education expenses; deductions	Special Deductions; Educational Expenditure
彭添富	針對「辦理九十四年原住民	Aboriginal life	housing subsidies
李復興	發現自九十三年一月間起	Old-age benefits; labor retirement	Retired employees allowance for the elderly
盧秀燕	針對早期退除役軍官給與補	Veterans welfare	Grants for early retired officers
丁守中	針就民眾陳情指出，目前政	Welfare for the handicapped	Living allowance
馮定國	鑑於國內經濟結構的快速	Elderly Welfare	Aging; middle and old age unemployment
彭添富	針對「豪雨成災，	Agricultural Subsidies	Heavy rain; crops
曾華德	為民國38年至43年間戌	Military Pay	Anti-Communist Salvation Army Reimbursement of Salary

Less-pork Featured



Legislator	Questions	Topics	Keywords
李復甸	鑑於刑事偵察實務上緩起	Investigation; litigation procedure	Criminal investigation; secret witness
林建榮	為立法院朝野協商修改銀	Financial management; bank management	Banking Law; Cash Card; Revolving Interest Rate
林正峰	針對行政院長張俊雄日前	Energy policy	Energy saving
林正峰	鑑於近年來臺灣地區毒品	Tobacco Restriction; Hospital	Drug Abuse; Departmental Hospital
王幸男	針對道路人孔蓋或管線挖	Public Safety	Manhole cover; public safety; road quality
管碧玲	針對近日台灣鐵路管理局	Railway management; ticket	Online booking; monopoly; Taiwan Railway
黃敏惠	就近日來爆發知名提神飲	Drinks; Poisoning	Drinks; Poisoning
陳朝龍	針對英國政府宣稱台灣出	Infectious disease prevention and control	British Government; Taiwanese birds; Avian Influenza



Tentative Findings

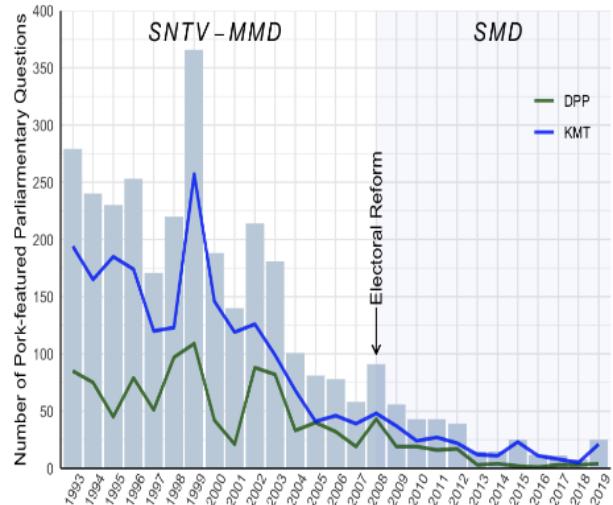
Table 3: Regression Analysis for District-level Pork-barrel Parliamentary Questions by Quarter-yearly

	Full Model		Major Parties		Minority Parties	
	Integration	(+Controls)	Integration	(+Controls)	Integration	(+Controls)
Reform	-14.052*** (3.946)	-13.125*** (5.085)	-14.959*** (4.173)	-16.346*** (5.569)	-11.180 (8.365)	4.954 (19.928)
Year	-.006*** (0.001)	-.006*** (0.001)	-.006*** (0.001)	-.008*** (0.001)	-.002 (0.002)	-.001 (0.003)
Reform x Year	.006*** (0.001)	.006*** (0.002)	.007*** (0.002)	.008*** (0.002)	.005 (0.004)	-.002 (0.009)
Constant	12.610*** (2.129)	12.713*** (2.735)	13.732*** (2.408)	16.206*** (3.672)	5.091 (5.614)	2.712 (6.546)
District Fixed Effects		✓		✓		✓
Legislator Fixed Effects		✓		✓		✓
The Reform Year	✓	✓	✓	✓	✓	✓
Observations	4,252	4,252	3,539	3,539	713	713
Adjusted R^2	0.016	0.218	0.020	0.233	0.003	0.179

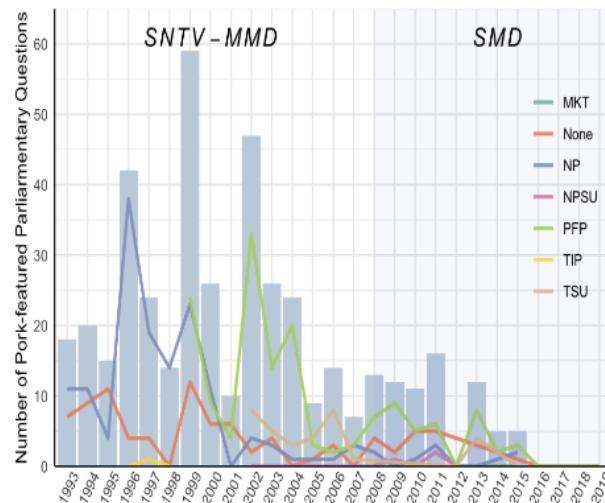
Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses. The district-level pork-barrel parliamentary question at quarter-yearly is regressed on year, electoral reform, and interaction between year and electoral reform, with and without controls. Controls include fixed effects for electoral districts, municipalities, and individual legislators and the occurrence of the reform.



Tentative Findings



(a) Major Parties: KMT and DPP



(b) Minority Parties: Others

Figure 5: The Number of Pork Barrel Question By Years



Tentative Findings

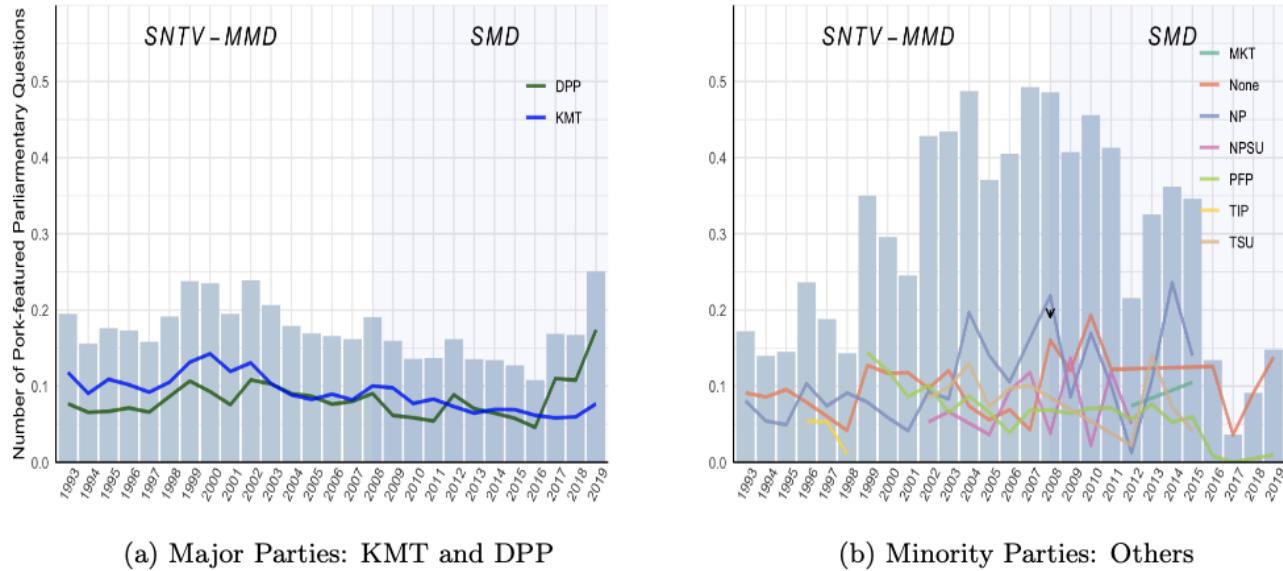


Figure 6: The Average Number of Pork Barrel Question By Years



Takeaway

- Evidence exists to show that legislators under MMD are more likely to express political intention about pork-barrel projects in written parliamentary questions.
- The reform subsequently demonstrates heterogeneous effects on major parties vis-à-vis the minority parties, respectively.
- Similar approach can be applied in European democracies.
- The Limitation:
 1. Training data originates from 2004-to 2007.
 2. Can the model be applied to earlier or later periods?
 3. Conducting explainable machine learning in Chinese or other Non-English languages may be somewhat challenging for social science students.



Thank You



Appendix

Miscellaneous

- PorkCNN: A Small Project for Pork Barrel Legislation Classification Using Convolutional Neural Networks (<https://github.com/davidycliao/PorkCNN>)
- Tensorboard of PorkCNN (<https://tensorboard.dev/experiment/2Jm6GKexQiKaLyUz5uKSzg/#scalars>)
- legisCrawler: An Automation Webcrawling Toolkit for Retrieving Taiwan Parliamentary Questions (<https://github.com/davidycliao/legisCrawler>)