Sheng, Xin; Gupta, Rangan

Book

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University of Pretoria
Department of Economics Working Paper Series

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Xin Sheng
Anglia Ruskin University
Rangan Gupta
University of Pretoria

Working Paper: 2021-87
December 2021

Department of Economics
University of Pretoria
0002, Pretoria
South Africa
Tel: +27 12 420 2413

A Note on State-Level Nonlinear Effects of Government Spending Shocks in the US: The Role of Partisan Conflict

Xin Sheng* and Rangan Gupta**

Abstract

Utilising a nonlinear (regime-switching) mixed-frequency panel vector autoregression model, we study the effects of government spending shocks in the United States (US) over the business cycle, while considering the role of partisan conflict. In particular, we investigate whether partisan conflict is relevant to the differences in fiscal spending multipliers in expansionary and recessionary business cycle phases upon the impact of annual government spending shocks using quarterly state-level data covering 1950:Q1 to 2016:Q4. We find new evidence that fiscal multipliers can vary with economic and political conditions. The cumulated effects of government spending shocks are strong and persistent in recessions when the level of partisan conflict is low.

JEL Codes: C32, E32, E62, H3

Keywords: Government Spending Shocks; Fiscal Policy Multiplier; Partisan Conflict; Panel Analysis; Vector Autoregressions; Mixed-Frequency

1. Introduction

In response to the Great Recession after the Great Financial Crisis in 2007-2008 and to the global recession caused by the COVID-19 pandemic, governments in most industrialised countries have implemented a series of substantial fiscal stimulus plans, in particular, spending-based measures to boost their sagging economies. The International Monetary Fund (2009) recommend sizeable discretionary fiscal stimulus packages being introduced by G20 countries to bolster demand and help turn around the global growth. The recent economic recessions, and the government fiscal policy responses to them, have led to a renewed research interest in the likely effects of fiscal stimulus in the United States (US) and across the world. A growing stream of literature in the field has focused on the nonlinear effects of fiscal policy over the

* Corresponding author. Lord Ashcroft International Business School, Anglia Ruskin University, Chelmsford, United Kingdom. Email: xin.sheng@anglia.ac.uk.

** Department of Economics, University of Pretoria, Private Bag X20, Hatfield 0028, South Africa; Email: rangan.gupta@up.ac.za.

business cycle, and suggested that the size of fiscal spending multipliers could be larger in recessions than in expansions (see for example, Auerbach and Gorodnichenko (2012, 2013), Atems (2019), Mumtaz and Sunder-Plassmann(2021) among others).

In recent years, US politics have been characterised by a high level of partisan conflict which has not only led to great political divisions, but also high fiscal policy-related uncertainty (Azzimonti, 2018). The presence of increased partisan conflict and political polarisation can translate into high economic policy uncertainty (Baker et al., 2014), amplify business cycles (Azzimonti and Talbert, 2014), delay private investment decisions (Canes-Wrone and Park, 2012; Azzimonti, 2018; 2021), and negatively affect the timing, quality and effectiveness of government policy changes in response to unfavourable exogenous shocks (Alesina and Drazen, 1991; Gupta, et al., 2019; Azzimonti 2021).

Building on this line of the existing literature, this paper investigates, for the first time, the effects of government spending shocks (as measured by fiscal spending multipliers) over the business cycle using state-level data for a panel of 50 US states, conditional on the level of partisan conflict. The study contributes to the literature by examining how spending multipliers manifested themselves in expansions and recessions while explicitly taking into consideration the important role of partisan conflict. We explore whether partisan conflict is relevant to the differences in cross-state fiscal multipliers in boom and recessionary business cycle episodes upon the impact of annual government spending shocks by utilising a nonlinear (regime-switching) panel vector autoregression (PVAR) model of Mumtaz and Sunder-Plassmann (2021), characterised by mixed-frequency, given the usage of also quarterly data in the model, which in turn allows us to cover a long sample period of 1950:Q1 to 2016:Q4. The model allows for possible effects of structural breaks and provides estimates of not only the regime-dependent average fiscal multipliers, but also the same for individual US states.

The remainder of this paper is organised as follows. Section 2 describes the data and methodology, Section 3 discusses empirical results, and Section 4 provides a conclusion.

2. Data and Methodology

Our panel dataset includes state-specific employment, real spending per capita, real income per capita across 50 US states and the sample period is ranged from 1950:Q1 to 2016:Q4, with the

fiscal policy, i.e., the spending variable being measured annually to give the model a mixed-frequency structure.[1] We use the partisan conflict index (PCI) to measure the degree of partisan conflict in the US.[2] The index tracks the level of political disagreement about government policy among US politicians and measures the frequency of media coverage in newspapers reporting disagreement among policymakers.

Following Mumtaz and Sunder-Plassmann (2021), the nonlinear threshold PVAR model is specified as follows:

$$Z_{it} = \left(c_{1,i} + \sum_{j=1}^{P} b_{1,i,j} Z_{it-j} + \sum_{j=1}^{Q} d_{1,i,j} X_{t-j} + u_{it}\right) S_{it} + \left(c_{2,i} + \sum_{j=1}^{P} b_{2,i,j} Z_{it-j} \sum_{j=1}^{Q} d_{2,i,j} X_{t-j} + u_{it}\right)(1 - S_{it}) \quad (1)$$

where Z_{it} represents the endogenous variables of the model, $Z_{it} = \begin{pmatrix} G_{it} \\ Y_{it} \\ E_{it} \end{pmatrix}$. $G_{it} = (\tilde{G}_{it} - \tilde{G}_{it-1})/\tilde{Y}_{it-1}$, $Y_{it} = (\tilde{Y}_{it} - \tilde{Y}_{it-1})/\tilde{Y}_{it-1}$, $E_{it} = (\tilde{E}_{it} - \tilde{E}_{it-1})/\tilde{Y}_{it-1}$, and $\tilde{G}_{it}$ is the real spending per capita for each US state i, $\tilde{Y}_{it}$ is the real income per capita for state i, and $\tilde{E}_{it}$ is state-specific employment.[3] The regime-switching variable S_{it} is determined by a state-specific threshold process: $S_{it} = 1 \Leftrightarrow z_{it-d_i} \leq z_i^*$, where z_{it} is the four-quarter moving sum of Y_{it} and is approximately equal to the annual growth rate of real income. $c_{1,i}$ and $c_{2,i}$ capture the fixed effects in regime 1 (i.e., during recessions) and regime 2 (i.e., during expansions) for state i. X_t denotes a set of exogenous predictors at the US national level, including the real government spending per capita, real taxes per capita, real GDP per capita, GDP deflator, 3-month US Treasury bill rate, and Moody's seasoned Baa corporate bond yield.[4] In this study, we multiply a PCI dummy variable with federal government spending and create an interaction variable that allows us to investigate the effects of spending shocks in recessions and expansions under both high- and low-PCIs.[5] The government spending multipliers are then calculated as the ratio of the cumulated impulse responses of real income to spending shocks.

[1] The sample period selected in this study is the same as the one in Mumtaz and Sunder-Plassmann (2021). The data are available at: http://qed.econ.queensu.ca/jae/datasets/mumtaz004/.
[2] The data is available at: http://marina-azzimonti.com/datasets/.
[3] The endogenous variables are transformed following the procedure of Hall (2009). The lag length of the VAR model is 4 (i.e., P=4).
[4] The lag length of the exogenous variables is set to 1 (i.e, Q=1).
[5] We define the dummy variable PCI_high equals 1 when PCI is larger than its median, and zero otherwise. Similarly, the dummy variable PCI_low is equal to 1 PCI is low than its median, and zero otherwise.

The model allows for estimates of the regime-dependent spending multipliers for the average state and individual state *i*.

3. Results and Analysis

We first report the estimated spending multipliers of an "average or typical" state in the US from the posterior estimates of the average parameters of the model. Figure 1 shows the estimated multipliers for real income for the average state in recessions and expansions when PCI is low (in Panel A) and when PCI is high (in Panel B).

[Insert Figure 1 about here]

We provide new evidence that the cumulated effects of government spending shocks are strong and persistent during recessions when the level of partisan conflict is low. Our results show that, in the recession-regime, government expenditure multipliers are large and statistically significant at all 40 horizons when PCI is low (as shown on the left of Panel A). In contrast, government spending multipliers are smaller in size and only significant in the short horizon in the regime of recessions when PCI is high (as shown on the left of Panel B). The finding aligns with the work of Azzimonti (2018), who observes a negative relationship between partisan conflict and private investment in the US. High levels of partisan conflict can lead to high fiscal policy uncertainty, make expected returns on investment less predictable and discourage private investment, thereby reducing the expansionary effects of government spending shocks on real income.

We also find that fiscal multipliers are positive and statistically significant at short-horizons during expansions when the level of partisan conflict is low. This is indicative of the fact that government spending shocks can increase income in the short run in times of economic expansion when the degree of political disagreement about government policy among US politicians is low. Our results show that, in the expansionary regime, government spending multipliers dissipate quite fast within 4 quarters when PCI is low (as shown in the middle of Panel A). In contrast, when PCI is high, government spending multipliers are negative and statistically significant at some horizons, but in general, these multipliers are not statistically different from zero for most horizons in expansions (as shown in the middle of Panel B).

Furthermore, our results also show large differences in the size of multipliers in recessions and expansions, with these differences being bigger when the level of partisan conflict is high than when it is low. As shown on the right of Panels A and B, the null hypothesis that the difference in multipliers in recessions and expansions equals zero can be rejected across all horizons. The differences in multipliers in recessions and expansions across 40 horizons are around 0.15 when PCI is low and around 0.30 when PCI is high. Our results, showing that fiscal multipliers are systematically larger in recessions relative to expansions, are in line with the findings from the existing literature. (see for example, Auerbach and Gorodnichenko (2012, 2013), Mumtaz and Sunder-Plassmann (2021), among others). This finding is consistent with the economic intuition that government spending shocks are less likely to crowd out private investment and consumption in recessions. Furthermore, we provide support to the view of nonlinear effects of government spending shocks and present new evidence that the fiscal multipliers can vary with both the economic and political conditions of the country.

[Insert Figure 1 about here]

The model specified in Equation (1) does not only provide estimates of the regime-dependent spending multipliers for the average state in the US, but it also allows for calculations of spending multiplies for each US state. In Table 1, we report the estimated cumulated cross-state spending multipliers at the 40-quarter horizon in recessions and expansions when PCI is low and when PCI is high.

[Insert Table 1 about here]

Our results indicate the presence of heterogeneity in spending multipliers across individual states. We find evidence that fiscal stimulus is a particularly useful tool that policymakers in some US states can employ in recessions when the level of partisan conflict is low. For example, as shown in Panel A of Table 1, when PCI is low, we observe that the spending multipliers in Indiana (IN), Maryland (MD), and Michigan (MI) are 2.06, 3.01, and 1.91, respectively, in times of recessions.

4. Conclusion

Using a regime-switching mixed-frequency PVAR model and state-level data, this paper investigates the effects of annual government spending shocks on quarterly real income, while explicitly taking into consideration the important role of partisan conflict in the US. The study

explores the differences in government spending multipliers in the expansionary and recessionary business cycle episodes, when partisan conflict is low and high. We find new evidence that fiscal multipliers can vary with economic and political conditions. The cumulated effects of government spending shocks are strong and persistent during recessions when the level of partisan conflict is low. In contrast, government spending multipliers are smaller in size and only statistically significant in the short horizon in recessions when the degree of political disagreement about government policy among US politicians is high. Our results also show that fiscal multipliers are systematically larger in recessions relative to expansions.

References

Atems, B. (2019). The effects of government spending shocks: Evidence from US states. Regional Science and Urban Economics, 74, 65-80.

Alesina, A., and Drazen, A. (1991). Why are Stabilizations Delayed?. The American Economic Review, 1170-1188.

Auerbach, A.J., and Gorodnichenko, Y. (2012). Measuring the output responses to fiscal policy. American Economic Journal: Economic Policy, 4(2), 1-27.

Auerbach, A.J. and Gorodnichenko, Y. (2013). Fiscal Multipliers in Recession and Expansion. In Alesina, A. and Giavazzi, F., editors, Fiscal Policy after the Financial Crisis, 63-98: University of Chicago Press.

Azzimonti, M. (2018). Partisan conflict and private investment. Journal of Monetary Economics, 93, 114-131.

Azzimonti, M. (2021). Partisan conflict, news, and investors' expectations. Journal of Money, Credit and Banking, 53(5), 971-1003.

Azzimonti, M., and Talbert, M. (2014). Polarized business cycles. Journal of Monetary Economics, 67, 47-61.

Baker, S. R., Bloom, N., Canes-Wrone, B., Davis, S.J., and Rodden, J. (2014). Why has US policy uncertainty risen since 1960?. American Economic Review, 104(5), 56-60.

Blanchard, O., and Perotti, R. (2002). An empirical characterization of the dynamic effects of changes in government spending and taxes on output. the Quarterly Journal of Economics, 117(4), 1329-1368.

Canes-Wrone, B., and Park, J.K. (2012). Electoral business cycles in OECD countries. American Political Science Review, 106(1), 103-122.

Gupta, R., Lau, C.K.M., Miller, S.M., and Wohar, M.E. (2019). US fiscal policy and asset prices: The role of partisan conflict. International Review of Finance, 19(4), 851-862.

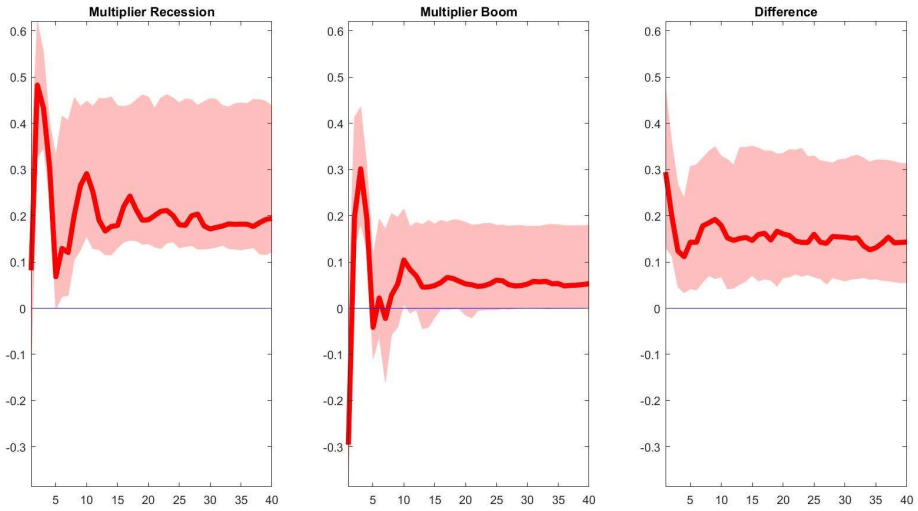
Hall, R.E. (2009). By how much does GDP rise if the government buys more output? Brookings Papers on Economic Activity, 40(2), 183–249.

IMF. (2009). Global Economic Policies and Prospects. In Group of 20 Meeting of the Ministers and Central Bank Governors.

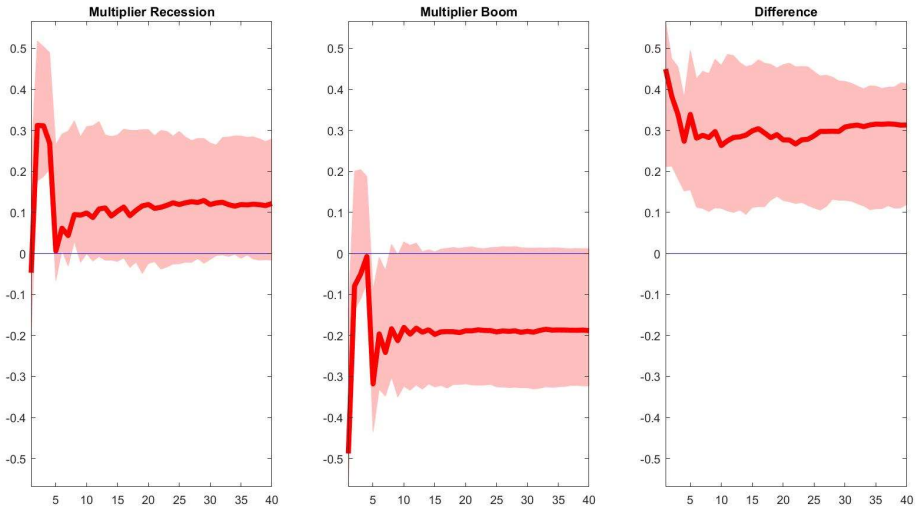
Mumtaz, H., and Sunder-Plassmann, L. (2021). Nonlinear effects of government spending shocks in the USA: Evidence from state‐level data. Journal of Applied Econometrics, 36(1), 86-97.

Figure 1. The estimated spending multipliers of an "average state" in the US

Panel A: Spending multipliers when PCI is low



Panel B: Spending multipliers when PCI is high



Notes: Figure 1 shows the estimated spending multipliers for the average state when PCI is low (in Panel A) and when PCI is high (in Panel B) in the recession- and expansion-regimes and the difference in multipliers in these two regimes. The shaded areas indicate the 68% highest posterior density interval (HPDI) for multipliers.

Table 1. The estimated state-specific multipliers in recessions and expansions

Panel A: Spending multipliers in recessions

US states	*when PCI is low*			*when PCI is high*		
	multipliers	-1SD	+1SD	multipliers	-1SD	+1SD
AL	0.25	-0.44	1.07	-0.16	-0.86	0.54
AK	0.50	0.26	1.17	0.39	-0.62	0.80
AZ	-0.23	-1.00	1.17	-0.61	-1.83	1.06
AR	0.65	-0.23	1.12	0.45	-0.68	0.98
CA	-0.08	-0.86	0.29	-0.86	-1.30	-0.13
CO	-0.60	-2.00	1.06	-1.16	-1.64	1.25
CT	0.12	-1.47	1.36	0.76	-1.35	2.29
DE	0.67	-1.10	1.46	0.23	-0.66	1.49
FL	-0.10	-1.20	1.36	-0.11	-2.13	1.74
GA	-0.01	-1.14	1.52	0.51	-1.67	1.16
HI	0.28	-0.46	1.26	0.37	-0.30	1.33
ID	0.56	-0.55	1.17	0.14	-0.87	0.82
IL	-0.50	-0.72	0.34	-0.52	-0.84	0.10
IN	2.06	1.31	2.94	2.19	1.49	2.68
IA	1.02	-0.13	1.43	0.67	-0.82	2.33
KS	0.88	0.27	1.53	0.27	-0.22	1.19
KY	1.04	0.49	1.28	0.68	0.28	1.09
LA	0.23	-0.90	0.74	-0.36	-0.82	0.45
ME	0.71	0.43	0.92	0.32	0.08	0.76
MD	3.01	1.22	4.23	2.12	-1.12	3.32
MA	-0.39	-1.49	0.63	0.11	-0.70	1.29
MI	1.91	1.11	3.26	2.17	-0.11	3.04
MN	0.51	-0.27	0.83	0.36	-0.39	0.94
MS	0.98	0.40	1.88	0.72	-0.38	1.14
MO	-0.18	-0.72	1.29	-0.21	-0.83	0.41
MT	-0.82	-1.36	0.20	-0.75	-2.82	-0.08
NE	0.36	-0.93	1.33	0.06	-1.55	1.36
NV	0.61	-0.11	1.40	0.67	-0.79	1.50
NH	0.67	-0.52	1.20	-0.16	-0.86	0.65
NJ	0.51	-0.14	1.01	0.22	-0.33	0.92
NM	0.22	-0.43	0.79	-0.14	-0.61	0.40
NY	-0.35	-0.83	0.21	-0.78	-1.76	-0.50
NC	-0.59	-1.34	0.44	-0.95	-1.58	-0.38
ND	-0.64	-4.30	0.48	-1.60	-3.93	0.98
OH	-0.25	-0.92	0.44	-0.24	-0.65	0.63
OK	0.92	-0.45	1.52	0.25	-1.21	1.82
OR	0.16	-0.93	1.11	-0.04	-1.10	0.44
PA	-0.18	-0.79	0.64	-0.06	-0.77	0.62
RI	0.62	0.31	0.95	0.81	0.12	1.39
SC	0.32	-0.07	1.02	0.38	-0.29	1.47

SD	1.37	-0.19	3.01	0.95	-0.81	1.95
TN	0.29	-0.81	1.19	0.02	-0.71	0.88
TX	0.01	-0.80	0.83	0.12	-0.26	0.95
UT	1.05	0.30	2.39	0.37	-0.56	1.28
VT	0.54	0.14	0.97	0.63	-0.02	1.30
VA	0.54	-0.65	1.44	0.40	-1.08	1.44
WA	-0.75	-1.69	-0.29	-0.74	-1.71	-0.31
WV	0.14	-0.33	1.31	0.40	-0.32	1.32
WI	0.25	-0.04	0.78	0.33	-0.03	0.60
WY	-0.25	-1.48	0.75	-0.70	-1.62	-0.16

Panel B: Spending multipliers in expansions

US states	*when PCI is low*			*when PCI is high*		
	multipliers	-1SD	+1SD	multipliers	-1SD	+1SD
AL	0.22	-0.23	0.51	-0.29	-0.62	0.11
AK	0.25	-0.14	0.49	0.00	-0.29	0.30
AZ	-0.51	-1.42	0.33	-0.87	-2.21	-0.12
AR	0.36	-0.30	1.26	0.26	-0.18	0.97
CA	-1.25	-2.51	-0.98	-1.72	-3.03	-1.47
CO	-1.29	-1.93	-0.05	-1.95	-2.92	-0.78
CT	0.03	-0.63	0.84	-0.30	-0.92	0.42
DE	0.47	-0.64	0.86	0.35	-0.49	0.71
FL	-0.21	-1.66	0.50	-0.58	-2.58	0.63
GA	-0.19	-1.27	0.55	-0.29	-1.42	0.33
HI	0.65	0.16	1.01	0.24	-0.12	0.85
ID	0.49	-0.47	1.54	-0.20	-1.09	0.83
IL	-0.59	-1.19	-0.23	-0.93	-1.43	0.02
IN	1.03	0.04	1.81	1.03	0.32	1.68
IA	0.68	-0.08	1.37	-0.20	-0.70	1.38
KS	0.67	-0.09	1.44	-0.03	-0.87	0.59
KY	0.74	0.28	1.09	0.30	-0.11	0.95
LA	0.30	-0.44	0.56	-0.27	-0.91	0.29
ME	0.52	0.17	1.02	0.12	-0.24	0.57
MD	1.40	0.64	1.79	0.57	-0.17	1.03
MA	-0.35	-1.10	0.54	-0.76	-1.67	-0.04
MI	0.43	-0.64	1.43	-0.01	-0.94	0.79
MN	0.37	-0.43	0.90	0.02	-0.63	0.52
MS	0.86	0.06	1.40	0.43	-0.55	0.76
MO	-0.25	-0.97	0.46	-0.84	-1.30	-0.16
MT	-0.88	-1.48	-0.24	-1.15	-2.16	-0.16
NE	0.25	-0.60	0.90	-0.45	-1.45	0.54
NV	0.19	-0.65	0.87	-0.30	-1.30	1.01
NH	0.36	-0.01	1.22	-0.37	-0.78	0.12
NJ	0.68	0.39	1.24	0.28	-0.29	0.72
NM	-0.05	-0.47	0.19	-0.57	-0.94	-0.24
NY	-0.65	-1.20	0.02	-1.00	-1.61	-0.49

NC	-0.86	-1.43	0.24	-0.98	-1.89	-0.44
ND	-2.23	-3.34	-0.43	-1.99	-4.69	-0.12
OH	-0.53	-1.16	0.11	-0.88	-1.18	-0.17
OK	0.33	-0.67	1.29	-0.21	-1.28	1.13
OR	0.13	-0.49	0.74	-0.63	-1.44	-0.07
PA	-0.91	-1.17	0.14	-0.67	-1.36	0.20
RI	0.31	0.07	0.66	0.06	-0.20	0.51
SC	-0.11	-0.71	0.29	-0.25	-0.80	0.19
SD	0.66	-1.60	1.64	0.40	-1.57	1.23
TN	0.19	-0.29	0.66	-0.39	-1.30	0.61
TX	-1.13	-2.48	-0.05	-1.64	-2.07	-0.58
UT	0.45	0.11	1.02	0.10	-0.58	0.78
VT	0.03	-0.45	0.45	0.11	-0.27	0.36
VA	0.81	-0.07	1.18	0.03	-0.85	0.90
WA	-0.54	-0.84	-0.19	-0.54	-1.40	-0.18
WV	0.29	-0.02	0.99	0.18	-0.26	0.68
WI	0.10	-0.08	0.70	-0.12	-0.38	0.30
WY	-0.62	-1.55	0.34	-0.84	-2.12	-0.26