Volatility Forecasting Using Similarity-based Parameter Correction and Aggregated Shock Information

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Introduction

1. Donec fringilla, velit id lobortis commodo, eros dui consectetur mi, ut interdum lorem dui sed mauris.
2. Nulla ac nulla rhoncus est bibendum ullamcorper:
3. Quisque vestibulum, nisl sit amet gravida ultricies dis parturient montes, nascetur ridiculus musobortis commodo, eros dui consectetur mi.

Setting

Donec fringilla, velit id lobortis commodo, eros dui consectetur mi, ut interdum lorem dui sed mauris. Duis id sem nunc, a pharetra odio. Phasellus posuere semper massa, id bibendum ligula tristique at. Integer sit amet vulputate turpis. Sed erat lacus, faucibus at viverra et, mattis nec sem. Cras faucibus scelerisque cursus. Opet volutpat ligula.

Duis semper lorem eget dui dignissim porttitor. Nulla facilisi. In ullamcorper lorem quis dolor iaculis nec egestas enim ultricies. Cras ut mauris elit, ut lacinia dui. Proin in ante et libero hendrerit iaculis. Nulla eu erat a urna laoreet auctor id a turpis. Nam mollis tristique neque eu luctus. Suspendisse rutrum congue nisi sed convallis. Aenean id neque dolor.

Methodology

- Vestibulum nisl, quis euismod velit eros in ligula.
  - Cras rhoncus quam et augue convallis in elementum urna tincidunt.
- Proin ut vestibulum augue.
  - Donec dapibus sagittis neque eu ultrices.

Figure 1: Anther of thale cress (*Arabidopsis thaliana*), fluorescence micrograph. Source: Heiti Paves, `https://commons.wiki-\media.org/wiki/File:Tolmukapea.jpg`.

Loss Functions

- International support:
  - àáâãäåèéêëìíîïòóôõöøùúûüÿñçčšž
  - ÀÁÂÃÄÅÈÉÊËÌÍÎÏÒÓÔÕÖØÙÚÛÜŸÝÑ
  - ßÇŒÆČŠŽ
- Maecenas Vel Nisl Elit
  - Suspendisse potenti. Fusce a est eget turpis rhoncus varius sed sed dui. Cras justo nibh, bibendum a cursus eget, consequat et dui. Maecenas vel nisl elit, sed dignissim dolor.
  - In hac habitasse platea dictumst.
- Viewpoint Matching Constraints
  - Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus.
  - Proin in nisi diam.
  - Nam ultricies pellentesque nunc, ultrices volutpat nisl ultrices a.

Properties of Volatility Shocks and Shock Estimators

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent porttitor arcu luctus, imperdiet urna iaculis, mattis eros. Pellentesque iaculis odio vel nisl ullamcorper, nec faucibus ipsum molestie. Sed dictum nisl non aliquet porttitor.

$$X \to r(X) = \arg\max_c \left\{ \max_n \left\{ \sum_x \delta(x_i, Y_{n,c}) \right\} \right\} \qquad (1)$$

Numerical Examples

- Ased Aliquet Luctus Lectus

Table 1: Table caption.

Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Aliquam arcu turpis, ultrices sed luctus ac, vehicula id metus. Morbi eu feugiat velit, et tempus augue. Proin ac mattis tortor. Donec tincidunt, ante rhoncus luctus semper, arcu lorem lobortis justo, nec convallis ante quam quis lectus.

Table 2: Another table caption.

	Location	
East Distance	West Distance	Count
100km	200km	422
350km	1000km	1833
600km	1200km	890

- Vivamus lobortis eros et massa porta porttitor.

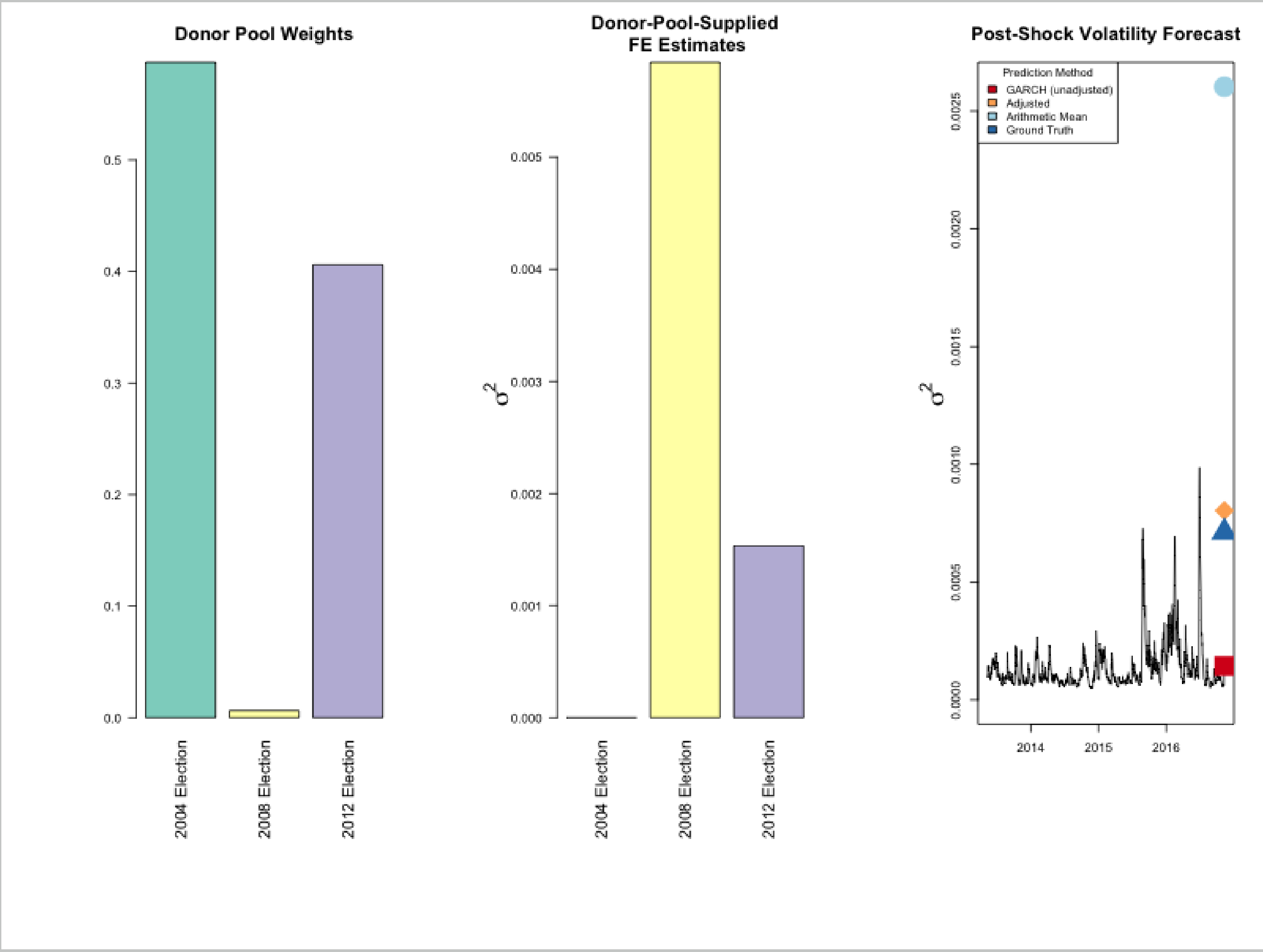## Real Data Example: Aftermath of Donald Trump's 2016 Victory

Figure 2: Bovine pulmonary artery endothelial cells in culture. Blue: nuclei; red: mitochondria; green: microfilaments. Computer generated image from a 3D model based on a confocal laser scanning microscopy using fluorescent marker dyes.

Conclusions

1. Opet volutpat ligula. Duis semper lorem eget dui dignissim porttitor. Nulla facilisi. In ullamcorper lorem quis dolor iaculis nec egestas enim ultricies. Cras ut mauris elit, ut lacinia dui. Proin in ante et libero hendrerit iaculis.

References

[1] Alberto Abadie, Alexis Diamond, and Jens Hainmueller. Synthetic control methods for comparative case studies: Estimating the effect of california's tobacco control program. *Journal of the American Statistical Association*, 105(490):493–505, 2010.

[2] Torben G Andersen, Tim Bollerslev, Francis X Diebold, and Paul Labys. Modeling and forecasting realized volatility. *Econometrica*, 71(2):579–625, 2003.

[3] Giovanni De Luca et al. Forecasting volatility using high-frequency data. *Statistica Applicata*, 18, 2006.

[4] Torben G Andersen, Tim Bollerslev, and Francis X Diebold. Roughing it up: Including jump components in the measurement, modeling, and forecasting of return volatility. *The review of economics and statistics*, 89(4):701–720, 2007.