Shih-Tang Hwu

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Education

University of Washington, Seattle, WA

Ph.D. in Economics, 2018 (Expected)

- Dissertation: Essays in Dynamic Linear Model and Partial Identification.
- References: Yanqin Fan (Co-Chair), Chang-Jin Kim (Co-Chair), Jeremy Piger, Jing Tao

M.A. in Economics, 2014

National Tsing Hua University, Hsinchu, Taiwan

M.A. in Economics, 2010

National Taipei University, Taipei, Taiwan

B.B.A. in Statistics, 2008

Research Interests

Econometrics, Applied Time Series, Empirical Macroeconomics

Publications

1. "Noncompliance with the Estate Tax in Taiwan," (in Chinese), with Shih-Ying Wu, *Taiwan Economics Review*, 40, 389-420, 2012.

Working Papers

1. "Markov-Switching Models with Unknown Error Distributions," (Job Market paper), with Chang-Jin Kim, 2017. (Under Review)
2. "Estimating the Elasticity of Intertemporal Substitution when Instruments are Weak: Identification Through Time-Varying Volatility," 2017.
3. "Estimating Trend Inflation Based on Unobserved Components Models: Is It Correlated with the Inflation Gap?" with Chang-Jin Kim, 2017. (Under Review)
4. "An N-State Endogenous Markov-Switching Model with Applications in Macroeconomics and Finance," with Chang-Jin Kim and Jeremy Piger, 2017. (Under Review)
5. "Partial Identification in Moment Equality Models with Auxiliary Data," with Yanqin Fan and Dongming Zhu, 2017.
6. "Measurement of Technical Efficiency in Stochastic Frontier Analysis with Limited and Qualitative Dependent Variable," with Wen-Jen Tsay, 2017.

Work in Progress

1. "Predictive System with Predictive Regressors," with Chang-Jin Kim, 2017.
2. "Asymmetric Stochastic Volatility Model with Asymmetric Shocks," with Chang-Jin Kim, 2017.
3. "Identification and Inference in Moment Models Under Data Combination," with Yanqin Fan, Xuetao Shi and Jing Tao, 2017.

Seminars and Conference Presentations

Taiwan Economics Research (Taipei),	2017
3rd Seattle-Vancouver Econometrics Conference (Vancouver),	2016
24th Symposium of the SNDE (Tuscaloosa),	2016
MTI brownbag (Seattle),	2016
Applied Economics Conference (Seattle),	2015
87th Annual Conference, WEAI (Seattle),	2013

Awards and Fellowships

Grover and Creta Ensley Fellowship in Economic Policy, University of Washington, Seattle, 2016

Teaching and Research Experience

Research Assistant

Research Assistance for Prof. Wen-Jen Tsay 2011-2012
Institute of Economics, Academia Sinica

Instructor

Introduction to Microeconomics	Summer 2014, Autumn 2015, Autumn 2016

Teaching Assistant

Econometrics II (Ph.D.)	Winter 2015, Winter 2016, Winter 2017
Econometrics III (Ph.D.)	Spring 2016
Introduction to Microeconomics	Autumn 2013
Introduction to Macroeconomics	Winter 2014, Spring 2014, Autumn 2014, Spring 2015

Professional Activities

Referee for *Journal of Econometrics*, *Journal of Applied Econometrics*, *Econometric Reviews*, *Studies in Nonlinear Dynamics and Econometrics*.

Other Information

Languages: English (Fluent), Chinese (Native)
Computer Skills: Stata, R, Matlab, GAUSS

References

Yanqin Fan (Co-Chair)
Department of Economics
University of Washington
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Chang-Jin Kim (Co-Chair)
Department of Economics
University of Washington
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Jeremy Piger
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University of Oregon
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Jing Tao
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Abstract of Working Papers

1. Markov-Switching Models with Unknown Error Distributions, with Chang-Jin Kim, 2017.

   To this day, the basic Markov-switching model has been extended in various ways ever since the seminal work of Hamilton (1989). Without exception, however, estimation of Markov-switching models in the literature has relied upon parametric assumptions on the distribution of the error term. In this paper, we first examine the pitfalls of estimating Markov-switching models by maximizing a normal log-likelihood when the normality assumption is violated. We then present a Bayesian approach for estimating Markov-switching models with unknown and potentially non-normal error distributions. We approximate the unknown distribution of the error term by the Dirichlet process mixture of normals, in which the number of mixtures is treated as a parameter to estimate. In doing so, we pay a special attention to identification of the model. We apply the proposed model to the growth of post-war U.S. industrial production index in order to investigate its regime-switching dynamics. Our univariate model can effectively control for the irregular components that is not related to business conditions. This leads to sharp and accurate inferences on recession probabilities just like the dynamic factor models of Kim and Yoo (1995), Chauvet (1998), and Kim and Nelson (1998) do.

2. Estimating the Elasticity of Intertemporal Substitution when Instruments are Weak: Identification Through Time-Varying Volatility.

   Elasticity of intertemporal substitution (EIS) is one of the most important parameters in applied macroeconomics and finance. However, literature has reported very different results on the magnitude of EIS, some researchers

argue that EIS is low and closed to 0, while others state that EIS is larger than 1. As pointed out by Neely, Roy, and Whiteman (2001), Campbell (2003), and Yogo (2004), weak instruments could be the reason for this inconsistency in estimation of EIS. To overcome this problem, several weak instrument robust tests were proposed in the literature. Although these tests have asymptotic correct size when the instruments are arbitrarily weak, the power of these tests strongly depends on the strength of instruments. When instruments are very weak, robust tests may lead to uninforma-tive confidence interval. This paper shows that with time varying volatility, there exists a feasible control function approach to consistently estimate the effect of endogenous variables in a linear regression model with only weak instruments. Simulations show that inference based on proposed approach have correct asymptotic size and better finite sample power performance compare with weak instrument robust tests. We apply proposed approach to estimate the EIS in Yogo (2004). Confidence intervals based on proposed methods are much tighter than those constructed by weak instrument robust tests and its value is generally close to 0.

3. Estimating Trend Inflation Based on Unobserved Components Models: Is It Correlated with the Inflation Gap?, with Chang-Jin Kim, 2017.

   Building on the work of Stock and Watson (2007), this paper empirically shows that a negative correlation between trend inflation and the inflation gap plays an important role in the dynamics of postwar US inflation. This negative correlation has an important implication on the costs of inflation and provides an indirect evidence suggesting that an increase in trend inflation tends to reduce the market power of firms as advocated by Benabou (1992a, 1992b). The resulting estimate of trend inflation is smooth, and our model provides superior out-of-sample forecasts than Stock and Watsons (2007) unobserved components model with stochastic volatility or than Atkeson and Ohanians (2001) random walk model does.

4. An N-State Endogenous Markov-Switching Model with Applications in Macroeconomics and Finance, with Chang-Jin Kim and Jeremy Piger, 2017.

   We develop an N-regime Markov-switching model in which the latent state variable driving the regime switching is endogenously determined with the model disturbance term. The model's structure captures a wide variety of patterns of endogeneity, and yields a simple test of the null hypothesis of exogenous switching. We derive an iterative filter that generates objects of interest, including the model likelihood function and estimated regime probabilities. Using simulation experiments, we demonstrate that the maximum likelihood estimator performs well in finite samples and that a likelihood ratio test of exogenous switching has good size and power properties. We provide results from two applications of the endogenous switching model: a three-state model of U.S business cycle dynamics and a three-state volatility model of U.S. equity returns. In

both cases we find statistically significant evidence in favor of endogenous switching.

5. Partial Identification in Moment Equality Models with Auxiliary Data, with Yanqin Fan and Dongmin Zhu, 2017.

   In this paper we study identification and inference for a finite dimensional parameter defined by a finite number of moment equalities when the sample information comes from two separate data sets. Unlike existing work in the literature assuming the same data structure, we allow some or all moment functions to be non-additively separable. By an application of the continuous version of the monotone rearrangement inequality, we convert moment equalities corresponding to non-additively separable moment functions to moment inequalities with unknown functions. As a result, we obtain a set of moment equalities/inequalities with unknown functions characterizing the parameter of interest. Two main examples that motivate our model are: a generalized two-sample IV model and a generalized linear projection model. Via a detailed analysis of the identified set of the unknown parameter in both models, we demonstrate that incorporating moment inequalities help shrink the identified set and may help identify the sign of the parameter of interest which is not identified otherwise. Moreover using both models we illustrate how existing inference procedures such as those in Andrews and Soares (2010) can be modified to account for the first step estimation of the unknown functions appearing in the moment inequalities.

6. Measurement of Technical Efficiency in Stochastic Frontier Analysis with Limited and Qualitative Dependent Variable, with Wen-Jen Tsay, 2017.

   As vividly demonstrated in Maddala (1983), limited and qualitative data have been widely employed in modern econometric analysis. However, analytical methods for evaluating technical efficiency of stochastic frontier analysis can only be applied to continuous dependent variable. This paper provides closed form formulae for evaluating the technical efficiency of stochastic frontier analysis with limited and qualitative dependent variable. Monte Carlo experiments reveal that the finite sample performances of our formulae are promising.