Annotated Bibliography

Bayesian VARs: Large Models, Time-Varying Parameters,
Stochastic Volatility, Factor Models, and Nonparametric Extensions

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Compiled May 13th 2026

This expanded annotated bibliography provides full citations for key papers in the Bayesian vector autoregression (BVAR) literature, arranged chronologically. It tracks the evolution from foundational Minnesota priors to high-dimensional models and modern nonparametric extensions.

Table 1: Classification of Key Bayesian VAR Literature by Sub-Area

Sub-Area	Core Focus	Key References
Foundations	Development of the Minnesota prior, shrinkage schemes, and basic MCMC samplers.	Litterman (1979, 1986); Doan et al. (1984); Kadiyala & Karlsson (1997)
Large Models	High-dimensional systems, global-local shrinkage (Horseshoe, Lasso), and computational scalability.	Bańbura et al. (2010); Koop (2013); Giannone et al. (2015); Carriero et al. (2019)
Time-Variation	Time-varying parameters (TVP) and structural change in macroeconomic coefficients.	Lopes et al. (1999); Cogley & Sargent (2001, 2005); Primiceri (2005)
Volatility	Stochastic volatility (SV), common factors in variance, and handling pandemic outliers.	Uhlig (1997); Kastner et al. (2017); Carriero et al. (2016, 2022)
Nonparametrics	Nonlinearity via Gaussian Processes, BART, and Dirichlet Process Mixtures.	Chipman et al. (2010); Kalli & Griffin (2018); Huber & Rossini (2022); Hauzenberger et al. (2025)
Structural & ID	Structural VARs (A_0 matrix), sign and zero restrictions, and prior sensitivity in set-identification.	Sims & Zha (1998); Uhlig (2005); Rubio-Ramírez et al. (2010); Baumeister & Hamilton (2015)

1. Foundations and Fixed-Coefficient VARs

1. Litterman (1979)

Techniques of forecasting using vector autoregressions. Federal Reserve Bank of Minneapolis Working Paper 115.

The founding document of the Minnesota prior.

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2. Doan, Litterman & Sims (1984)

Forecasting and conditional projection using realistic prior distributions. Econometric Reviews 3(1), 1-100.

The first comprehensive applied case for the Minnesota prior.

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3. Litterman (1986)

Forecasting with Bayesian vector autoregressions: five years of experience. Journal of Business & Economic Statistics 4(1), 25-38.

Retrospective showing that the Minnesota prior consistently beats unrestricted VARs and competing forecasts.

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4. Sims (1993)

A nine-variable probabilistic macroeconomic forecasting model. In Business Cycles, Indicators, and Forecasting (Stock & Watson, eds.), University of Chicago Press.

Bridges from Minnesota to richer reference priors.

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5. Kadiyala & Karlsson (1993)

Forecasting with generalized Bayesian vector autoregressions. Journal of Forecasting 12(3-4), 365-378.

Beyond Minnesota: Normal-Wishart and Normal-Diffuse alternatives.

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6. Kadiyala & Karlsson (1997)

Numerical methods for estimation and inference in Bayesian VAR models. Journal of Applied Econometrics 12(2), 99-132.

The first systematic Gibbs-sampler treatment of BVAR posteriors; benchmark paper for the MCMC era.

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7. Uhlig (1997)

Bayesian vector autoregressions with stochastic volatility. Econometrica 65(1), 59-73.

Earliest proper Bayesian treatment of BVAR with time-varying error variances.

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8. Sims & Zha (1998)

Bayesian methods for dynamic multivariate models. International Economic Review 39(4), 949-968.

The Sims-Zha prior over structural BVARs that became the workhorse for monetary VARs.

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2. Time-Variation and Stochastic Volatility

9. Lopes, Moreira & Schmidt (1999)

Hyperparameter estimation in forecast models. Computational Statistics & Data Analysis 29(4), 387-410.

Bayesian dynamic-model framework with time-varying coefficients and data-driven hyperparameter estimation, applied to Brazilian macro forecasting; pre-dates the better-known Sargent and Primiceri work.

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10. Cogley & Sargent (2001)

Evolving post-World War II U.S. inflation dynamics. NBER Macroeconomics Annual 16, 331-373.

Reintroduces TVP-VAR to mainstream macro after almost two decades of dormancy.

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11. Waggoner & Zha (2003)

A Gibbs sampler for structural vector autoregressions. Journal of Economic Dynamics and Control 28(2), 349-366.

MCMC scheme for non-recursive structural BVARs that unlocks identified SVAR posterior inference.

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12. Bernanke, Boivin & Eliasz (2005)

Measuring the Effects of Monetary Policy: A Factor-Augmented Vector Autoregressive (FAVAR) Approach. Quarterly Journal of Economics 120(1), 387-422.

Augments structural VARs with latent factors extracted from a large panel of macroeconomic indicators.

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13. Cogley & Sargent (2005)

Drifts and volatilities: monetary policies and outcomes in the post WWII U.S. Review of Economic Dynamics 8(2), 262-302.

Adds stochastic volatility to TVP-VAR; "the" model for slow-moving structural change.

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14. Primiceri (2005)

Time varying structural vector autoregressions and monetary policy. Review of Economic Studies 72(3), 821-852.

Canonical TVP-VAR with stochastic volatility and a fully time-varying covariance Cholesky factor. The most cited TVP-VAR paper.

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3. Large BVARs and Dimensionality

15. De Mol, Giannone & Reichlin (2008)

Forecasting using a large number of predictors: is Bayesian shrinkage a valid alternative to principal components? Journal of Econometrics 146(2), 318-328.

Theoretical foundation for letting BVAR dimension grow large with appropriate shrinkage.

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16. Carriero, Kapetanios & Marcellino (2009)

Forecasting exchange rates with a large Bayesian VAR. International Journal of Forecasting 25(2), 400-417.

Among the first to take "large" beyond 20 series in an applied forecasting setting.

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17. Banbura, Giannone & Reichlin (2010)

Large Bayesian vector autoregressions. Journal of Applied Econometrics 25(1), 71-92.

The benchmark paper for scaling Minnesota-style priors with VAR dimension; opens the large-BVAR research program.

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18. Koop & Korobilis (2010)

Bayesian multivariate time series methods for empirical macroeconomics. Foundations and Trends in Econometrics 3(4), 267-358.

Comprehensive survey, still the standard reference.

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19. Clark (2011)

Real-time density forecasts from Bayesian vector autoregressions with stochastic volatility. Journal of Business & Economic Statistics 29(3), 327-341.

Shows that BVAR-SV systematically beats homoskedastic BVAR for density forecasts in real time.

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20. Koop (2013)

Forecasting with medium and large Bayesian VARs. Journal of Applied Econometrics 28(2), 177-203.

Systematic comparison of Minnesota-style and SSVS-style shrinkage across VAR sizes from medium to

large.

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21. Korobilis (2013)

VAR forecasting using Bayesian variable selection. Journal of Applied Econometrics 28(2), 204-230.

Spike-and-slab and SSVS priors as alternatives to global shrinkage in large BVARs.

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22. Koop & Korobilis (2013)

Large Time-Varying Parameter VARs. Journal of Econometrics 177(2), 185-198.

Uses discount-factor (forgetting-factor) approximations to enable estimation of large TVP-VARs in real time.

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23. Kastner & Frühwirth-Schnatter (2014)

Ancillarity-Sufficiency Interweaving Strategy (ASIS) for Boosting MCMC Estimation of Stochastic Volatility Models. Journal of Computational and Graphical Statistics 23(4), 1103-1123.

ASIS sampler delivers order-of-magnitude efficiency gains for SV models.

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24. Carriero, Clark & Marcellino (2015)

Bayesian VARs: specification choices and forecast accuracy. Journal of Applied Econometrics 30(1), 46-73.

Definitive empirical guide on which BVAR specification choices actually matter for out-of-sample performance.

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25. Giannone, Lenza & Primiceri (2015)

Prior selection for vector autoregressions. Review of Economics and Statistics 97(2), 436-451.

Hierarchical Bayes treatment in which shrinkage hyperparameters are estimated from data.

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26. Del Negro & Primiceri (2015)

Time varying structural vector autoregressions and monetary policy: a corrigendum. Review of Economic Studies 82(4), 1342-1345.

Fixes a subtle MCMC ordering error in Primiceri (2005).

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27. Carriero, Clark & Marcellino (2016)

Common Drifting Volatility in Large Bayesian VARs. Journal of Business & Economic Statistics 34(3), 375-390.

Introduces a common SV factor that allows exact conjugate sampling in large systems.

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28. Korobilis (2016)

Prior Variance Estimation in Direct Return Forecasting. Journal of Business & Economic Statistics 34(2), 205-221.

Adapts adaptive shrinkage priors to the BVAR context.

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29. Kastner, Frühwirth-Schnatter & Lopes (2017)

Efficient Bayesian Inference for Multivariate Factor Stochastic Volatility Models. Journal of Computational and Graphical Statistics 26(4), 905-917.

Develops an interweaving MCMC algorithm for efficient factor SV estimation.

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30. Huber, Krisztin & Piribauer (2017)

Forecasting global equity indices using large Bayesian VARs. Bulletin of Economic Research 69(3), 288–308.

Applied large BVAR study for global equity indices.

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31. Koop, Korobilis & Pettenuzzo (2019)

Bayesian compressed VARs. Journal of Econometrics 210(1), 135-154.

Random projection / compression as a route to "huge" BVARs.

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32. Carriero, Clark & Marcellino (2019)

Large Bayesian vector autoregressions with stochastic volatility and non-Gaussian errors. Journal of Econometrics 212(1), 137-154.

Brings stochastic volatility (and t-distributed innovations) into truly large BVARs.

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33. Huber & Feldkircher (2019)

Adaptive shrinkage in Bayesian vector autoregressive models. Journal of Business & Economic Statistics 37(1), 27-39.

Global-local shrinkage priors ported to BVAR.

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34. Korobilis & Pettenuzzo (2019)

Adaptive hierarchical priors for high-dimensional vector autoregressions. Journal of Econometrics 212(1), 241-271.

Scalable continuous hierarchical priors with fast posterior approximations.

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35. Kastner (2019)

Sparse Bayesian Time-Varying Covariance Estimation in Many Dimensions. Journal of Econometrics 210(1), 98-115.

Hierarchical global-local shrinkage on factor loadings for large systems.

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36. Kastner & Huber (2020)

Sparse Bayesian vector autoregressions in huge dimensions. Journal of Forecasting 39(7), 1142–1165.

Addresses sparsity and huge dimensions in BVARs.

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37. Cross, Hou & Poon (2020)

Macroeconomic forecasting with large Bayesian VARs: Global-local priors and the illusion of sparsity. International Journal of Forecasting 36(3), 899–915.

Evaluates global-local priors vs. standard shrinkage.

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38. Chan (2020)

Large Bayesian VARs: a flexible Kronecker error covariance structure. Journal of Business & Economic Statistics 38(1), 68-79.

Restores covariance flexibility in large BVAR without losing computational tractability.

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39. Huber, Koop & Onorante (2021)

Inducing Sparsity and Shrinkage in Time-Varying Parameter Models. Journal of Business &

Economic Statistics 39(3), 669-683.

Global-local shrinkage priors for automatic TVP determination.

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40. Hosszejni & Kastner (2021)

Modeling Univariate and Multivariate Stochastic Volatility in R with stochvol and factorstochvol. Journal of Statistical Software 100(12), 1-34.

De facto standard computational infrastructure for SV in macro models.

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41. Carriero, Chan, Clark & Marcellino (2022)

Corrigendum to "Large Bayesian vector autoregressions with stochastic volatility and non-Gaussian errors". Journal of Econometrics 227(2), 506-512.

Fixes a sampling-step error in the 2019 paper; the current reference algorithm.

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42. Cimadomo et al. (2022)

Nowcasting with large Bayesian vector autoregressions. Journal of Econometrics 231(2), 500–519.

Advanced application of large BVARs for nowcasting.

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43. Carriero, Clark, Marcellino & Mertens (2022)

Addressing COVID-19 Outliers in BVARs with Stochastic Volatility. Review of Economics and Statistics 104(6), 1195-1212.

Augments BVAR-SV with an outlier component to quarantine pandemic-era shocks.

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4. Nonparametric and Nonlinear Extensions

44. Chipman, George & McCulloch (2010)

BART: Bayesian additive regression trees. Annals of Applied Statistics 4(1), 266-298.

Methodological parent of tree-based VARs.

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45. Jensen & Maheu (2010)

Bayesian semiparametric stochastic volatility modeling. Journal of Econometrics 157(2), 306-316.

Foundational use of Dirichlet-process mixtures for innovations in SV models.

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46. Frigola, Lindsten & Schön (2013)

Bayesian inference and learning in Gaussian process state-space models with particle MCMC. NeurIPS 26.

Methodological ancestor: brings GP priors into nonlinear state-space modelling.

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47. Bassetti, Casarin & Leisen (2014)

Beta-product dependent Pitman-Yor processes for Bayesian inference. Journal of Econometrics 180(1), 49-72.

Pitman-Yor machinery for later BNP-VARs.

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48. Kalli & Griffin (2018)

Bayesian nonparametric vector autoregressive models. Journal of Econometrics 203(2), 267-282.

The BayesNP-VAR: simultaneously nonparametric in mean, variance, and innovation distribution.

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49. Billio, Casarin & Rossini (2019)

Bayesian nonparametric sparse VAR models. Journal of Econometrics 212(1), 97-115.

Combines Dirichlet-process priors with Lasso-like shrinkage.

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50. Huber & Rossini (2022)

Inference in Bayesian Additive Vector Autoregressive Tree Models. Annals of Applied Statistics 16(1), 104-123.

The BAVART model: BART for multivariate time series.

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51. Clark et al. (2023)

Tail Forecasting with Multivariate Bayesian Additive Regression Trees. International Economic Review 64(3), 979-1022.

Combines BART with SV for gains in tail density forecasts.

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52. Huber, Koop, Onorante & Pfarrhofer (2023)

Nowcasting in a pandemic using non-parametric mixed-frequency VARs. Journal of Econometrics 232(1), 52-69.

GP-VAR flexibility capturing COVID-period structural breaks.

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53. Huber & Koop (2023)

Fast and Order-Invariant Inference in Bayesian VARs with Non-Parametric Shocks. Journal of Econometrics, forthcoming.

DPM for innovations with fast slice-sampling MCMC scheme.

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54. Karlsson, Mazur & Nguyen (2023)

Vector autoregression models with skewness and heavy tails. Journal of Economic Dynamics and Control, forthcoming.

Bridges parametric flexibility with nonparametric mixtures.

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55. Chan (2023)

BVARs and Stochastic Volatility. Journal of Econometrics 235(2), 1419-1446.

Comprehensive survey of SV classes suited for large BVARs.

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56. Clark, Huber, Koop & Marcellino (2024)

Forecasting US Inflation Using Bayesian Nonparametric Models. Journal of Econometrics, forthcoming.

Systematic comparison of GP, DPM, and BART-based approaches.

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57. Hauzenberger et al. (2024+)

Bayesian neural networks for macroeconomic analysis. Journal of Econometrics, forthcoming.

Bayesian neural networks as the mean function in multivariate models.

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58. Hauzenberger, Huber, Marcellino & Petz (2025)

Gaussian process vector autoregressions and macroeconomic uncertainty. Journal of Business & Economic Statistics 43(1), 27-43.

The "GP-VAR" reference.

59. Lima & Lopes (2025)

Minnesota BART: Structured Priors for Multivariate Bayesian Additive Regression Trees. Working Paper.

Structured shrinkage priors embedded into multivariate BART.

5. Structural BVARs and Identification

60. Sims & Zha (1998)

Bayesian methods for dynamic multivariate models. International Economic Review 39(4), 949-968.

Foundational paper for structural BVARs; introduces the Sims-Zha prior for simultaneous equation models where the parameters of the A_0 matrix are of primary interest.

61. Canova & De Nicoló (2002)

Monetary disturbances and business cycle fluctuations: evidence from countries. European Economic Review 46(6), 1131-1159.

One of the pioneering papers to use sign restrictions on impulse response functions for identification within a Bayesian framework.

62. Uhlig (2005)

What are the effects of monetary policy on output? Results from an agnostic identification procedure. Journal of Monetary Economics 52(2), 381-419.

The landmark paper for "agnostic" identification using sign restrictions on IRFs; it remains the standard reference for set-identified BVARs.

63. Rubio-Ramírez, Waggoner & Zha (2010)

Structural vector autoregressions: Theory of identification and algorithms for inference. Review of Economic Studies 77(2), 665-696.

Provides necessary and sufficient conditions for global identification and efficient algorithms for drawing from the posterior of structural parameters.

64. Baumeister & Hamilton (2015)

Sign restrictions, structural vector autoregressions, and useful prior information. Econometrica 83(5), 1963-1999.

Highlights the sensitivity of sign-restricted models to the prior on the rotation matrix and proposes incorporating explicit prior beliefs about structural elasticities.

65. Arias, Rubio-Ramírez & Waggoner (2018)

Inference based on structural vector autoregressions identified with (zero and) sign restrictions. Econometrica 86(2), 685-720.

Introduces a rigorous algorithm for models combining sign and zero restrictions, ensuring correct posterior inference for set-identified systems.

66. Giacomini & Kitagawa (2021)

Robust Bayesian inference for set-identified models. Econometrica 89(4), 1519-1556.

Develops a robust Bayesian approach to handle prior sensitivity in set-identified models by considering a class of priors for the rotation matrix.