RESEARCH STATEMENT
By Tatevik Sekhposyan

I am a macro-econometrician with research interests in three interrelated areas: (i) study of macroeconomic models in the presence of time variation; (ii) characterization of uncertainty and its macroeconomic effects; (iii) use of "large" datasets for questions of policy relevance. My contributions in these topic areas are both theoretical and empirical in nature and are discussed in detail below.

My work on understanding the behavior of macroeconomic models in the presence of time variation and the subsequent provision of appropriate frameworks for theoretically valid inference has started during my graduate studies, while I started working on the characterization of uncertainty and its macroeconomic effects when I was employed at the (central) Bank of Canada. Though some of the papers that use "large" datasets to shed light on macroeconomic issues have been initiated during my graduate studies, I have renewed interest in the subject matter. Currently I am more interested in using large datasets for prediction, characterization of uncertainty, and for identification.

I.   MACROECONOMIC MODELS AND TIME VARIATION

Time variation is important in economics: policies change, data measurement changes and our knowledge of how to use the available information best to understand the dynamics of the economy evolves over time (we learn to postulate better models and estimate them more accurately). Estimation of macroeconomic models as well as their evaluation is considerably more difficult in the presence of time variation. This is due to the violation of covariance stationarity, an assumption commonly maintained in models using time-series data. Moreover, the economic policy recommendations can be drastically different in the presence of time variation. For instance, during the Great Recession of 2008:I-2009:II and in the follow up prolonged slow recovery economists were concerned whether we were in a "new normal." The answer would determine whether the policymaker should do something different than what was done before.

In this light, Michael Owyang and I evaluate the stability of Okun's "law" in a *Review* article **"Okun's Law over the Business Cycle: Was the Great Recession All that Different?"** The objective is to use structural break tests and break-robust estimation techniques (rolling window estimation in this case) to understand the slow recovery of the labor market after the Great Recession. We have shown that the Great Recession and the follow up recovery were not statistically different from those in the recorded history in terms of the sensitivity of unemployment to output fluctuations. Thus, the rule of thumb that typically assigns a 2- to 3-percentage-point decrease in real gross domestic product (GDP) growth to a 1-percentage-point increase in the unemployment rate is robust. If anything, there is evidence of increased level shifts in the unemployment rate during recessions, the sources of which would be interesting to investigate in future research.

Out-of-sample losses have been used as convenient measures to summarize various sources of errors associated with model misspecification and suboptimal estimation procedures, which can include the failure to take into account time variation in the presence of one.

In **"Have Economic Models' Forecasting Performance for US Output Growth and Inflation Changed over Time, and When?"** (*International Journal of Forecasting*, 2010) Barbara Rossi and I evaluate the relative out-of-sample forecasting performance of a wide range of parsimonious macroeconomic models for output growth and inflation by employing the Fluctuation test and One-time Reversal procedure that Barbara has proposed in her previous work. We find that though, on average, the relative forecasting performance of the economic models have been the same as those of the naïve time-series models, the performance has been unstable over time. More specifically, majority of economic models have been statistically superior to the naïve models in terms of their forecasts prior to mid-1980s, i.e. in the pre-Great Moderation period. However, their relative advantage has deteriorated over time, yielding multiplicity of models that are statistically identical in terms of their forecasting performance at the practitioners' disposal.

Given the time variation in the forecasting performance of the models, the natural question is to what extent time variation explains the superiority of one forecast relative to another at a given point in time. This is the issue we investigate in **"Understanding Models' Forecasting Performance"** (*Journal of Econometrics*, 2011) with Barbara Rossi. In the paper we decompose the relative forecasting performance of the models into asymptotically uncorrelated (under the null) components that shed light on why models differ in their relative forecasting performance. The proposed components measure time variation, predictive content and over-fit. The component that is related to time variation captures the expected difference in the relative forecasting performance over a sub-sample compared to the full out-of-sample. In other words, this is the expected differential between the conditional and unconditional relative performance. The full out-of-sample relative losses, on the other hand, can be decomposed into a component that measures marginal predictive content and a measure of over-fit. The marginal predictive content captures the extent to which models' in-sample performance correlates with its out-of-sample one. Over-fitting is the flip side of the same phenomenon and captures the situation where the inclusion of irrelevant regressors improve the in-sample fit of the model, yet penalize its out-of-sample performance. Over-fit is essentially measured by the residual from the regression of out-of-sample relative losses on the in-sample ones.

Under the null hypothesis of no time variation, no marginal predictive content and no over-fit, we derive the asymptotic distribution of the components. The asymptotic distribution is derived in two frameworks: (i) when the estimation window is small and fixed and does not grow with the sample size, i.e. when the parameter estimation error does not vanish asymptotically and is maintained under the null; and (ii) when the researcher employs a recursive estimation scheme, i.e. when the estimation window size grows with the overall sample size. The asymptotic distribution for the time variation component is non-standard, and, in general, depends on nuisance parameters. However, in the case of (i) and, with additional assumptions, also in the case of (ii), the limiting distribution for the test statistic simplifies to a functional of standard univariate Brownian motions. Consequently, we can tabulate the critical values. Instead, the tests for measuring marginal predictive content and over-fit are asymptotically normally distributed. The setup in the paper is general and can be applied to absolute (as opposed to relative) and regression-based measures of predictability.

We show the usefulness of the proposed methodology on an exchange rate forecasting application. While looking at the economic models for bilateral exchange rates of a sample of five industrialized countries relative to a random walk, we find the latter, on average, is superior to economic models over the out-of-sample period. Our methodology suggests that the lack of predictive content is the major reason for the failure of the economic models relative to the random walk in terms of the mean squared forecast error (MSFE) differential over the short-run, while instabilities play a more important role for medium term, i.e. one-year-ahead, forecasts.

The paper above explores the method of statistical decomposition as an informative approach for understanding the relative forecasting performance of the models. Eleonora Granziera and I are currently working on an extension of this work in **"Predicting the Relative Forecasting Performance of the Models: Conditional Predictive Ability Approach"** in order to understand the economic (as opposed to statistical) mechanisms that can explain the time variation in the predictive performance of models. We use the conditional predictive ability framework of Giacomini and White (*Econometrica*, 2006) to detect whether certain episodes of economic significance, such as periods of high financial stress and uncertainty or economic downturn, can indeed explain the reversals of models' performance. It turns out that the knowledge of the economy being in a high financial stress/uncertainty environment could be helpful in selecting an appropriate forecasting model to be used for a particular future date. We use this result to propose a strategy for model selection and model averaging that has a potential to improve the accuracy of the prediction over naïve and competitive benchmarks. These improvements are fairly frequent, though their magnitude typically does not exceed ten percent.

Understanding the behavior of forecasting models and forecasts are important for central banking from two perspectives. First, accurate forecasts guide monetary policy actions, which, given the implementation lag of the policy, are typically forward looking in nature. Second, forecasts are informative for understanding how agents form their expectations. The rationality of the agents' forecasts

are embedded in most of the macroeconomic models used today. In this light, in **"Forecast Rationality Tests in the Presence of Instabilities, With Applications to Federal Reserve and Survey Forecasts"** (*Journal of Applied Econometrics*, 2016) Barbara Rossi and I assess the rationality of a variety of survey forecasts, namely the ones coming from the Federal Reserve staff in a form of Greenbook/Teelbook forecasts, as well as the private sector forecasts from the Survey of the Professional Forecasters and the Blue Chip Economic Indicators.

Typically these forecasts pass the rationality tests, i.e. they are unbiased, efficient and, in general, not forecastable with any information that is in the forecasters' information set at the time forecasts have been made. However, the typical tests miss the time variation in the rationality. For instance, the forecasts could be upward biased in the first part of the sample and downward biased in the second part, which, on average, would yield rational forecasts, even when in sub-samples the forecasts fail the rationality tests.

In our paper we develop a methodology that is more powerful in detecting the failures of rationality in the presence of instabilities relative to the existing alternatives. It is a sup-type test in the sense that it detects forecast breakdowns by running the regular regression-based rationality test, except with a rolling window (an assumption that could be relaxed), and picking the maximum of the test statistics. The framework we operate in is the one where the estimation sample gets larger as the sample size grows, however, the number of observations used for the estimation, as well as for the construction of the test statistic, should (in the limit) be a fixed proportion of the overall sample size.

The theoretical contribution of the paper addresses the limiting distribution of the proposed sup-type Wald test. The intricacy and the difference over the regular full sample rationality tests is that our proposed test statistic converges not to a regular Brownian motion, but to a time-transformed one, i.e. to a Browning motion the increments of which have time-varying variances. The reason is that, at any particular point in the evaluation sample, the uncertainty around the regression coefficients is different depending on the amount of in-sample information used for estimation. For instance, in the case of a recursive estimation, the importance of the early part of the sample becomes less and less important as the estimation window size increases. In the case of a rolling window estimation, one has to keep track of the in-sample parameter estimation error, the relevance of which for the overall uncertainty would change depending on the estimation and evaluation window sizes.

The asymptotic distribution of the proposed sup-type Wald tests is a functional of a time-transformed Brownian motions: it is not nuisance parameter free, however, it can be simulated. Under particular conditions, i.e. when parameter estimation error is not relevant or when testing for forecast unbiasedness and efficiency (these cases impose restrictions on the variance-covariance matrix), the asymptotic distribution simplifies. In these cases the limiting distribution becomes a functional of a standard Brownian motions, which can be tabulated given the estimation and evaluation window sizes.

When applying our test to the Federal Reserve staff and private sector forecasts, we detect forecast breakdowns. Most of the breakdowns pertain to the second part of the 1990s. When using the same framework to understand whether the Fed had informational advantage over the private sector forecasts, we find, consistent with the literature, that the Fed's comparative informational advantage has disappeared and most recently they add no additional information to the private sector forecasts.

II. MEASURES OF UNCERTAINTY AND EFFECTS ON MACROECONOMY

It is typically difficult to disentangle whether the economic processes have changed or whether the description of uncertainty has been inaccurate to start with. For example, if one has many unfavorable realizations in a period, it can be that the process has shifted, or that the prediction was not characterized with sufficient uncertainty. Many think that with correct characterization of uncertainty the Great Recession would have been anticipated with a higher likelihood. This has also prompted various central banks to take the accuracy of their fan charts (plots of predictive distributions) seriously. I contribute to the literature on uncertainty in two ways.

Firstly, in a few papers Barbara Rossi and I propose methods for understanding whether a given predictive density is correctly calibrated. This question is highly motivated by my experience as a central banker where one rarely sees measures of uncertainty reported in formal analyses and predictions

disclosed to the public. This lack of disclosure of uncertainty is typically motivated by the fact that it is difficult to understand whether the provided description of uncertainty is indeed accurate. Moreover, frequently the uncertainty implied by the macroeconomic models is high. Thus, it is challenging and risky to communicate this to the public as it can up-anchor the public expectations.

In the **"Alternative Tests for Correct Specification of Conditional Predictive Densities"** Barbara Rossi and I propose methods for evaluating conditional predictive densities. The innovation in this paper is that it provides a simple way to evaluate the correct specification of predictive densities, where both model specification and its estimation technique are evaluated jointly. This is particularly important since fan charts are often based on convoluted methodologies that involve a variety of models and subjective assessments: it is impossible to account for parameter uncertainty in those settings.

Using our methodology, the researchers and practitioners can test for proper calibration of one-step-ahead predictive densities using Kolmogorov-Smirnov- and Cramér–von Mises-type tests. In fact, given that in our framework parameter estimation error is maintained under the null hypothesis, even the traditional critical values of these tests apply, and there is no need to account for the parameter estimation error in the limiting distribution. However, in the paper we also provide improved critical values for the tests since the traditional critical values prove to be conservative in the Monte Carlo simulations. When evaluating multi-step-ahead densities, we propose to use weighted block bootstrap.

Our proposed tests are much simpler and more general than the ones existing in the literature, which typically rely on correct specification of models. In our case models can be mis-specified, yet the conditional predictive density can still be correctly specified since our approach evaluates the model and its estimation technique jointly. Given the different null hypothesis, we have a nuisance parameter free limiting distribution. In addition, readily available critical values apply to a wide variety of cases, cases that have previously required bootstrapped critical values. This simplicity comes at a cost of requiring limited memory estimators for the models. The main argument relies on the fact that any measurable function of a finite number of leads and lags of the original data preserves the mixing properties of the data, thus making it easy to work with central limit theorems.

Our framework is general and a variety of tests such as the one in Berkowitz (*JBES*, 2001) or Knueppel (*JBES*, 2015) can be cast in this framework. In the paper we formalize the conditions under which their proposed tests work in our framework and there is no need to adjust the limiting distributions for the uncertainty associated with parameter estimation error. We apply our tests to the US Survey of Professional Forecasters' density forecasts to show the usefulness of the proposed methodology.

In a related work titled **"Conditional Predictive Density Evaluation in the Presence of Instabilities"** (*Journal of Econometrics*, 2013), Barbara Rossi and I still look at the correct calibration of the conditional density forecasts. However, this time we propose methods that are more powerful in the presence of instabilities. In a way, this paper looks at the density forecast evaluation literature at an angle that is common to my first line of research: looking at the behavior of macroeconomic models in the presence of instabilities. As such, we operate under weaker assumptions, i.e. without imposing independence or covariance stationarity on the data generating process.

The theory relies on the probability integral transforms (PITs) and the fact that the PITs should be uniformly distributed when the predictive densities are correctly calibrated. We look at a test statistics that has two components, a piece that captures the correct calibration of the densities and a piece that looks at the correct calibration over a sub-sample. Our test nests out-of-sample variants of Corradi and Swanson (*Journal of Econometrics*, 2006) and Inoue (*Econometric Theory*, 2001). To establish the limiting distribution of the test statistic we use the fact that the sequential uniform (under the null) empirical processes converge to Gaussian distribution. Since the paper is concerned whether the proposed distribution is correct within a parametric family of distributions, the precision of parameter estimates matters for the characterization of uncertainty in the limiting Gaussian distribution of the test statistic. In the paper, we, in fact, analytically derive the adjustment to be made for certain distribution families and show how the critical values could be tabulated for particular empirical applications.[1] An application to

---

[1] It is possible to extend the framework of Rossi and Sekhposyan (2017) to provide simpler tests for detecting correct specification robust to instabilities.

the US Survey of Professional Forecasters detects breaks mostly at the start of the Great Moderation for nowcast densities and in late 1990s for the forecast densities.

Our paper **"Evaluating Predictive Densities of U.S. Output Growth and Inflation in a Large Macroeconomic Data Set"** (*International Journal of Forecasting*, 2014, received Outstanding Paper Award for 2014-2015) takes a more applied approach to the density evaluation and considers the correct calibration of densities using a large set of macroeconomic models, under the simplistic assumption of Gaussianity. We show that Gaussian densities are often appropriate for correct characterization of predictive uncertainty in the case of output growth. However, they often fail when predicting inflation.

My second contribution area to the uncertainty literature is in using predictive densities and forecast error distributions to construct measures of uncertainty, a source that has been argued to be important in the sluggish post-Great Recession recovery. The particularity of uncertainty is that it is, in general, unobserved. Its importance in explaining the business cycle fluctuations initiated a line of research proposing measures of uncertainty.

In **"Macroeconomic Uncertainty Indices Based on Nowcast and Forecast Error Distributions"** (*American Economic Review Papers & Proceedings*, 2015) Barbara Rossi and I propose measures of uncertainty based on, as the title suggests, nowcast and forecast error distributions. Our measures of uncertainty rely on the idea that the economy is more uncertain if it is less predictable. Moreover, the further in the tail the forecast error is in the forecast error distribution, the more uncertain the agents are. This measure uses the information in the whole distribution of forecast errors to construct the measure of uncertainty. We find this approach more convincing as often the forecast error distributions are skewed. A symmetric measure, such as dispersion, hides that information.

Moreover, as we base our index on the forecast error distribution, we can differentiate positive and negative surprises, thus upside and downside uncertainty, from each other. In fact, in the macroeconomic application where we look at the macroeconomic effects of uncertainty, we find that the downside measure of uncertainty has contractionary effects, while the upside uncertainty has expansionary effects. In fact, the measures, if averaged out, still have contractionary effect, yet it is milder and less persistent.

In **"Macroeconomic Uncertainty Indices for the Euro Area and its Individual Member Countries"** (*Empirical Economics*, 2017) we extend the construction of the uncertainty index to the Euro Area countries. The beauty of our index is that it only requires point forecasts, an easier measure to obtain relative to completely specified, survey- or model-based, predictive densities. Using the cross-country uncertainty dataset for the Euro Area, based on the forecasts provided by Consensus Economics, we trace the uncertainty spillovers. In fact, we find that spillovers are high; about 80% of uncertainty typically is of non-domestic origin. However, as it turns out, the level of the spillover index as well as the particular countries that import/export uncertainty very much depends on the specification of the network.

In **"Asymmetries in Monetary Policy Uncertainty: New Evidence from Financial Forecasts"** Tatjana Dahlhaus and I construct monetary policy uncertainty measures using the Federal Funds Rate (and other short term interest rate) forecasts. It turns out that the Blue Chip Financial Forecasts consistently underestimate the interest rate movements. However, it appears that the expectations are better anchored when the Federal Reserve is tightening the interest rate than when it is easing it, yielding more uncertainty in the easing cycle. These results hold even when we uses the Fed Funds Future's surprises as a base for the uncertainty measures. Using VAR analysis we establish that monetary policy uncertainty has no macroeconomic effects in the tightening cycles, while the effect is contractionary in the easing cycle.

Alongside with the measures we propose, there are a variety of uncertainty measures in the literature, and they have differential impact on the macroeconomy. In the paper with Barbara Rossi and Matthieu Soupre, **"Understanding the Sources of Macroeconomic Uncertainty,"** we aim to reconcile between the various measures of uncertainty. We use the Survey of Professional Forecasters' density forecasts to construct a continuous rank probability score measure (CRPS). We then decompose the average CRPS across the individuals into measures of aggregate uncertainty and disagreement. Aggregate uncertainty, on the other hand, can be decomposed into a measure of mean-bias (one could think of this as Knightian uncertainty, or violations of rationality) and realized risk. Alternatively, under the assumption of normality, we can decompose aggregate uncertainty into measures of ex-ante and ex-post uncertainty.

It turns out that disagreement about the density forecasts is negligible, does not have particularly interesting business cycle dynamics and has insignificant macroeconomic impact. Aggregate uncertainty, on the other hand, spikes up around recessions and picks up the episodes commonly associated with high uncertainty. The alternative decompositions of aggregate uncertainty associate a greater role to the mean-bias and ex-post uncertainty, with significant macroeconomic effects. The results emphasize the importance of understanding the difference between various types of uncertainty measures, and the choice one has to make depending on the question at hand.

III. LARGE DATASETS AND MACROECONOMY

Macroeconomic policy usually targets certain economic variables in aggregate, i.e. for the whole country. However, the impact on disaggregate units can be different. Moreover, one can look at the disaggregate responses to learn more about the transmission and the effects of policy. This line of research has been reasonably active lately, since post-Great Moderation (roughly after 1984) the macroeconomic time series have exhibited low variations, which makes it hard to do signal extraction. Consequently, the literature has started using cross-sectional/panel data for inference.

In **"The Local Effects of Monetary Policy,"** (*The B.E. Journal of Macroeconomics, Advances*) together with Neville Francis and Michael Owyang, we look at the city-level responses to monetary policy shocks by utilizing a panel of 105 metropolitan areas. Given the large cross sectional and short time series dimensions of the data, we rely on Bayesian shrinkage methods for inference. We further correlate the city level impulse responses with city level covariates using a model selection algorithm and find strong evidence that population density and local government size mitigate the effects of monetary policy on local employment. The roles of the traditional interest rate, equity, and credit channels are marginalized relative to the previous findings based on less-granular definitions of regions.

In **"Monetary Policy in a Currency Union: is the Euro Good for all?"** I look at a similar question, but at the level of Euro Area. The paper, consistent with the literature, finds heterogeneity in the Euro Area member economy responses to monetary policy shocks. However, there is also heterogeneity in monetary policy induced uncertainty. Understanding the causes of each is of high importance and could be relevant for anchoring inflation expectations. In a related work, **"Stabilization Effects of the Euro Area Monetary Policy,"** Michael Owyang and I look at a Euro Area Taylor rule. We find some evidence that the country-specific inflation and output growth measures matter differently for the Euro Area interest rate fluctuations relative to the weights used by the Euro Stat when constructing the Euro Area aggregate measures. Given that the unconventional monetary policy tools have become important recently, it would be interesting to re-visit the analyses in these papers for robustness.

In **"Real-time Forecasting with a Large, Mixed Frequency, Bayesian VAR,"** together with Michael McCracken and Michael Owyang, we evaluate the usefulness of a large, real-time macroeconomic dataset for forecasting purposes. We postulate an observation-driven, stacked vector autoregression, where the variables at a high frequency are treated as multiple variables at a low frequency. For instance, monthly variables are cast quarterly by treating the first, second and third months' of the quarter as separate, stand alone, variables. Stacking results in a high-dimensional system. Consequently, in order to control for estimation uncertainty in the high-dimensional setting, we employ Bayesian shrinkage. The beauty of this setup is that we can obtain nowcasts of low frequency variables, in our case GDP growth, on a high frequency basis, without having to rely on a particular filtering technique to obtain updates to the low frequency variables. This approach is computationally simple, allows us to have a unified approach to nowcasting and conditional forecasting and can deliver competitive results. This framework is very promising and could be extended for structural analysis.

REFERENCES

Berkowitz, J. 2001. "Testing Density Forecasts, With Applications to Risk Management." *Journal of Business and Economic Statistics* 19(4), 465-474.

Corradi, V. and N. R. Swanson. 2006. "Bootstrap Conditional Distribution Tests in the Presence of Dynamic Misspecification." *Journal of Econometrics* 133, 779-806.

Dahlhaus, T. and T. Sekhposyan. 2017. "Asymmetries in Monetary Policy Uncertainty: New Evidence from Financial Forecasts." *Mimeo.*

Francis, N. and M. Owyang. 2012. "The Local Effects of Monetary Policy." *The B.E. Journal of Macroeconomics* 12(2) (Advances).

Giacomini, R. and H. White. 2006. "Tests of Conditional Predictive Ability." *Econometrica* 74(6), 1545-1578.

Granziera, E. and T. Sekhposyan. 2017. "Predicting the Relative Forecasting Performance of the Models: Conditional Predictive Ability Approach." *Mimeo.*

Inoue, A. 2001. "Testing for Distributional Change in Time Series." *Econometric Theory* 17, 156-187.

Knueppel, M. 2015. "Evaluating the Calibration of Multi-Step-Ahead Density Forecasts Using Raw Moments." *Journal of Business and Economic Statistics* 33(2), 270-281.

McCracken, M., Owyang, M. and T. Sekhposyan. 2016. "Real-time Forecasting with a Large, Mixed Frequency, Bayesian VAR." *Mimeo.*

Owyang, M. and T. Sekhposyan. 2012. "Stabilization Effects of the Euro Area Monetary Policy." *Mimeo.*

Owyang, M. and T. Sekhposyan. 2012. "Okun's Law over the Business Cycle: Was the Great Recession All that Different?" Federal Reserve Bank of St. Louis *Review* 94(5), 399-418.

Rossi, B. and T. Sekhposyan. 2017. "Macroeconomic Uncertainty Indices for the Euro Area and its Individual Member Countries." *Empirical Economics* 53(1), 41-62.

Rossi, B. and T. Sekhposyan. 2016. "Forecast Rationality Tests in the Presence of Instabilities, With Applications to Federal Reserve and Survey Forecasts." *Journal of Applied Econometrics* 31(3), 507-532.

Rossi, B. and T. Sekhposyan. 2015. "Macroeconomic Uncertainty Indices Based on Nowcast and Forecast Error Distributions." *American Economic Review: Papers & Proceedings* 105(5), 650-655.

Rossi, B. and T. Sekhposyan. 2014. "Evaluating Predictive Densities of U.S. Output Growth and Inflation in a Large Macroeconomic Data Set." *International Journal of Forecasting* 30(3), 662-682.

Rossi, B. and T. Sekhposyan. 2013. "Conditional Predictive Density Evaluation in the Presence of Instabilities." *Journal of Econometrics* 177(2), 199-212.

Rossi, B. and T. Sekhposyan. 2011. "Understanding Models' Forecasting Performance." *Journal of Econometrics* 164(1), 2011, 158-172.

Rossi, B. and T. Sekhposyan. 2010. "Have Economic Models' Forecasting Performance for US Output Growth and Inflation Changed Over Time, and When?" *International Journal of Forecasting* 26(4), 808-835.

Rossi, B. and T. Sekhposyan. 2017. "Alternative Tests for Correct Specification of Conditional Predictive Densities." *Mimeo.*

Rossi, B., Sekhposyan. T. and M. Soupre. 2017. "Understanding the Sources of Macroeconomic Uncertainty." *Mimeo.*

Sekhposyan, T. 2010. "Monetary Policy in a Currency Union: is the Euro Good for all?" *Mimeo.*