Alternatives to the Anderson-Hsiao Estimator (Footnote 4):

Researchers have recently begun developing alternatives to the Anderson-Hsiao estimator. Arellano and Bover (1995) and Blundell and Bond (1998) report Monte Carlo evidence of a downward bias in the Anderson-Hsiao estimator when the true dynamic coefficient is equal to or greater than .8. They propose generalized method of moments (GMM) estimators using additional moment restrictions-supported by the structure of panel data-as superior alternatives. See also Ahn and Schmidt (1995). Using “forward orthogonal deviations” to sweep out the individual intercepts (as opposed to first-differencing) recommended by Arellano and Bover (1995) and an estimator based on a system of moment restrictions, we found the Anderson-Hsiao estimator to perform as well as the alternatives in recovering the simulated parameters. We also applied the GMM estimators to the NES data. Although the GMM approach produced several estimates that were at variance with the Anderson-Hsiao estimates, Sargan test results cast doubt on the appropriateness of the additional moment restrictions incorporated into the GMM estimators. See Arellano and Bond (1991) for a discussion of the Sargan test used in this context. The estimators’ comparable performances on simulated data may be due to the specific properties of the partisanship model. But the estimates from the NES studies produced by both GMM and Anderson-Hsiao estimators strongly suggest that the individual-level dynamic coefficients do not approach the high values (~.8) where bias becomes a critical issue.

Appendix B: Data Generating Processes (contd.)

“Switching”

The set of simulations reported in Table A1 incorporates, in addition to the correlated disturbances, a partisan “switching” effect; that is, in any given period *t*, an individual’s equilibrium partisanship may take on a new value with a probability of 0.01. So if an individual *i* is subject to switching at time *t*, then

$$y_{t,i} = \alpha^* + \beta_i y_{t-1,i} + u_{t,i}, \quad \text{where } \alpha^* \sim \textit{uniform distribution.}$$

Sampling Effects

For the results in Table A2, sampling effects are included as well. Each element in the simulated panel data set is an observation on a respondent drawn from an infinite population. For example, $y_{t=50,i=1}$ and $y_{t=51,i=1}$ are taken from series representing two different individuals in the population: the *i* subscript merely denotes a bookkeeping index and successive cross-sections in the panel are composed of entirely different individuals. Consequently, the estimates from simulations with sampling effects are restricted to those of aggregate time series parameters.

Appedix D: Stationarity and Unit Root Tests

The last three columns in Tables 2, 3, A1 and A2 report the fractions out of 100 replications in which the null hypotheses of the KPSS, ADF and VR tests, respectively, can be rejected at the 5% level for a given aggregate time series.

The KPSS Test — H_0: Stationarity

The test devised by Kwiatkowski et al. (1992) compares the null hypothesis of stationarity against the alternative of a unit root. The value of ℓ, the lag truncation parameter, is 4 for our time series with 200 periods. ℓ is the maximum order of autocorrelation calculated for the test statistic. The critical value of the statistic at the 5% level for $\ell = 4$ is 0.463.

The Augmented Dickey-Fuller (ADF) Test — H_0: Unit Root

The null hypothesis for the Augmented Dickey-Fuller (ADF) test is a unit root while the alternate is stationarity. The form of the Dickey-Fuller regression used for our simulations contains a constant but no linear trend. ADF is a version of the Dickey-Fuller test for use in the presence of correlated disturbances and we use 14 lagged first differences in order to remove the effects of serial correlation. See Davidson and MacKinnon (1993, pp. 710-12). The critical value at the 5% level is –2.86. GAUSS language routines by Alan G. Isaac and David Rapach for both the KPSS and ADF tests were adapted for our simulations. Their routines can be found at http://www.american.edu/academic.depts/cas/econ/gaussres/coint/unitroot.src.

The Variance Ratio (VR) Test — H_0: Unit Root

The variance ratio test compares the null hypothesis of a random walk with drift (*d* = 1) with an alternative of pure fractional integration (*d* < 1). Using a differencing interval of *k* = 4 (Diebold 1989), the critical value at the 5% level for 192 differenced observations is 1.294.

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Table A1

Effects of Individual-Level Heterogeneity on Aggregated ARFIMA and Individual-Level Panel Estimates, Simulated Data: Including Correlated Disturbances and "Switching"

Simulation Parameters	Estimated Models							Stationarity/Unit Root Tests		
1	2	3	4		5	6		7	8	9
AR(1)	d	AR(1)	ARMA(1,1)		Wiley Wiley	Anderson-Hsiao (4 time periods)		KPSS	ADF	VR
0.1	0.821	0.896	0.926	-0.162	0.979	0.162	(0.102)	0.76	0.16	0.95
0.2	0.782	0.921	0.960	-0.234	0.972	0.260	(0.121)	0.81	0.11	0.72
0.3	0.926	0.906	0.901	0.029	0.970	0.350	(0.122)	0.81	0.12	0.35
0.4	1.040	0.951	0.942	0.094	0.969	0.421	(0.145)	0.85	0.13	0.07
0.5	1.004	0.955	0.946	0.086	0.966	0.523	(0.169)	0.85	0.13	0.00
0.6	1.045	0.979	0.974	0.115	0.966	0.623	(0.186)	0.82	0.15	0.00
0.7	1.260	0.965	0.951	0.270	0.969	0.700	(0.261)	0.88	0.13	0.00
0.8	1.213	0.979	0.972	0.192	0.970	0.762	(0.465)	0.91	0.11	0.00
0.9	1.151	0.994	0.993	0.102	0.973	0.941	(0.986)	0.96	0.14	0.00
d										
0.1	0.805	0.892	0.933	-0.201	0.987	0.123	(0.102)	0.75	0.09	0.98
0.2	0.764	0.938	0.968	-0.219	0.982	0.175	(0.110)	0.84	0.11	0.90
0.3	0.827	0.917	0.937	-0.116	0.980	0.226	(0.126)	0.87	0.08	0.81
0.4	0.813	0.925	0.953	-0.201	0.978	0.288	(0.130)	0.84	0.16	0.65
0.5	0.830	0.920	0.940	-0.141	0.979	0.331	(0.162)	0.91	0.09	0.37
0.6	0.940	0.984	0.989	-0.103	0.976	0.437	(0.188)	0.90	0.11	0.39
0.7	0.913	0.980	0.985	-0.109	0.979	0.499	(0.220)	0.93	0.12	0.46
0.8	0.979	0.995	0.996	-0.014	0.981	0.626	(0.282)	0.92	0.10	0.36
0.9	0.983	0.998	0.998	-0.074	0.983	0.764	(0.492)	1.00	0.14	0.35

Table A2

Effects of Individual-Level Heterogeneity on Aggregated ARFIMA and Individual-Level Panel Estimates, Simulated Data: Including Correlated Disturbances, "Switching" and Sampling Effects

Simulation Parameters	Estimated Models				Stationarity/Unit Root Tests		
1	**2**	**3**	**4**		**5**	**6**	**7**
AR(1)	d	AR(1)	ARMA(1,1)		KPSS	ADF	VR
0.1	0.707	0.871	0.922	-0.224	0.64	0.18	1.00
0.2	0.763	0.895	0.940	-0.242	0.72	0.17	1.00
0.3	0.751	0.841	0.887	-0.160	0.66	0.18	1.00
0.4	0.774	0.972	0.983	-0.193	0.73	0.19	1.00
0.5	0.815	0.924	0.958	-0.242	0.79	0.15	1.00
0.6	0.832	0.941	0.963	-0.187	0.79	0.19	1.00
0.7	0.757	0.871	0.940	-0.282	0.79	0.22	1.00
0.8	0.764	0.941	0.977	-0.307	0.83	0.14	1.00
0.9	0.885	0.968	0.983	-0.242	0.89	0.15	1.00
d							
0.1	0.783	0.897	0.933	-0.182	0.68	0.19	1.00
0.2	0.667	0.774	0.848	-0.188	0.65	0.18	1.00
0.3	0.711	0.882	0.932	-0.241	0.71	0.12	1.00
0.4	0.842	0.966	0.982	-0.245	0.70	0.17	1.00
0.5	0.698	0.906	0.976	-0.429	0.79	0.18	1.00
0.6	0.576	0.951	0.991	-0.487	0.83	0.09	1.00
0.7	0.700	0.924	0.976	-0.370	0.83	0.14	1.00
0.8	0.695	0.942	0.983	-0.403	0.94	0.13	1.00
0.9	0.800	0.991	0.998	-0.440	1.00	0.10	1.00