This is a replication of Gourio and Miao (2010) - Firm Heterogeneity and the Long-run Effects of Dividend Tax Reform.

The original codes use Tauchen-Hussey method to discretize productivity shocks z, and I follow this even though nowadays we have better methods like Farmer-Toda. Original appears to have used pure discretization (so choices are on grid) with 300 points, I also use pure-discretization but put more points. Original uses a clever trick for dividends vs share issuance. I just take a more brute force approach.

Results are broadly the same, but with quantiative differences likely due to numerical error in the original.

I do not reproduce Tables 1 and 2 which are based on COMPUSTAT data (as well as a few other data numbers in other tables). If anyone wants to do so please let me know, and I will obviously make you 'coauthor' on this replication.

For more details on the model see Gourio and Miao (2010). For the codes implementing the replication see:
https://github.com/vfitoolkit/vfitoolkit-matlab-replication

References

Francois Gourio and Jianjun Miao. Firm heterogeneity and the long-run effects of dividend tax reform. American Economic Journal: Macroeconomics, 2:1:131–168, 2010. doi: 10.1257/mac.2.1.131.

Figure 1: Table 3 of Gourio and Miao (2010)

Baseline Parametrization

	Parameter	Value
Corporate income tax	τ_{corp}	0.340
Personal income tax	τ_i	0.250
Dividend tax	τ_d	0.250
Capital gains tax	τ_{cg}	0.200
Exponent on capital	α_k	0.311
Exponent on labor	α_l	0.650
Shock persistence	ρ	0.767
Shock standard deviation	σ	0.211
Depreciation rate	δ	0.095
Discount factor	β	0.971
Weight on leisure	h	6.616
Adjustment cost	ϕ	1.080

Figure 2: Original Table 3 of Gourio and Miao (2010)

TABLE 3—BASELINE PARAMETRIZATION

	Parameter	Value
Corporate income tax	τ_c	0.340
Personal income tax	τ_i	0.250
Dividend tax	τ_d	0.250
Capital gains tax	τ_g	0.200
Exponent on capital	α_k	0.311
Exponent on labor	α_l	0.650
Shock persistence	ρ	0.767
Shock standard deviation	σ	0.211
Depreciation rate	δ	0.095
Discount factor	β	0.971
Weight on leisure	h	6.616
Adjustment cost	ψ	1.080

Figure 3: Table 4 of Gourio and Miao (2010)

Aggregate and Cross-Sectional Moments in the Baseline Model

Variable	Data	Model
I/Y	-	0.151
Investment rate (I/K)	-	0.095
Aggregate dividends/earnings	-	0.360
Aggregate new equity/investment	-	0.165
Volatility of investment rate	-	0.157
Autocorrelation of investment rate	-	0.649
Volatility of earnings/capital	-	0.176
Autocorrelation of earnings/capital	-	0.656

Notes: The autocorrelations are calculated at firm level (based on time series) and then averaged across firms. Volatility is calculated as standard deviation based on pooled observations. From codes of GM2010 it is clear that Investment Rate is actually reporting I/K, not I/Y. I include I/Y as reading the paper this is what I had initially assumed it to be.

Figure 4: Original Table 4 of Gourio and Miao (2010)

TABLE 4—AGGREGATE AND CROSS-SECTIONAL MOMENTS IN THE BASELINE MODEL

Variable	Data	Model
Investment rate	0.095	0.095
Aggregate dividends/earnings	0.137	0.353
Aggregate new equity/investment	0.130	0.148
Volatility of investment rate	0.156	0.156
Autocorrelation of investment rate	0.596	0.648
Volatility of earnings/capital	0.623	0.175
Autocorrelation of earnings/capital	0.791	0.658

Notes: The investment rate is computed from the National Income Accounts, and the other data are computed using COMPUSTAT. See Appendix Section B for the variable definition. Model moments are computed using parameter values listed in Table 3.

Figure 5: Table 5 of Gourio and Miao (2010)
Distribution of Firms across Finance Regimes in the Baseline Model

	Equity issuance regine	Liquidity constrained regime	Dividend distribution regime
Share of firms	0.246	0.309	0.445
Share of capital	0.135	0.191	0.674
Share of investment	0.469	0.331	0.200
Earnings-Capital Ratio	0.409	0.232	0.178
Investment-Capital Ratio	0.329	0.165	0.028
Average Tobins q	2.548	1.918	1.360

Notes: The share of firms for a regime is equal to the total number of firms in that regime divided by the total number of firms in all regimes. The share of capital (investment) for a regime is equal to the total capital stock (resp. investment) of the firms in that regime divided by aggregate capital stock (investment) of all firms. The earnings-capital ratio for a regime is equal to the earnings of the firms in that regime divided by their total capital stock, i.e., it is capital-weighted. The investment-capital ratio and Tobins q are computed in a similar way.

Figure 6: Original Table 5 of Gourio and Miao (2010)
TABLE 5—DISTRIBUTION OF FIRMS ACROSS FINANCE REGIMES IN THE BASELINE MODEL

	Equity issuance regime	Liquidity constrained regime	Dividend distribution regime
Share of firms	0.201	0.342	0.457
Share of capital	0.108	0.229	0.663
Share of investment	0.402	0.436	0.161
Earnings-capital ratio	0.431	0.264	0.170
Investment-capital ratio	0.354	0.181	0.023
Average Tobin's q	2.633	1.941	1.348

Notes: The share of firms for a regime is equal to the total number of firms in that regime divided by the total number of firms in all regimes. The share of capital (investment) for a regime is equal to the total capital stock (resp. investment) of the firms in that regime divided by aggregate capital stock (investment) of all firms. The earnings-capital ratio for a regime is equal to the earnings of the firms in that regime divided by their total capital stock, i.e., it is capital-weighted. The investment-capital ratio and Tobin's q are computed in a similar way. Parameter values are listed in Table 3.

Figure 7: Table 6 of Gourio and Miao (2010)
Aggregate Effects of the Dividend Tax Reform in the Baseline Model

	$\tau_d = 0.22$ $\tau_{cg} = 0.20$	$\tau_d = 0.20$ $\tau_{cg} = 0.20$	$\tau_d = 0.15$ $\tau_{cg} = 0.15$	$\tau_d = 0$ $\tau_{cg} = 0$
Capital	0.56	0.78	4.36	13.94
Output	0.64	1.04	2.14	4.96
Consumption	0.41	0.65	1.29	2.86
Dividends	5.97	N/A	N/A	N/A
Equity Issuance	35.15	N/A	N/A	N/A
Wage	0.52	0.85	1.72	3.91
Firm Value	3.54	6.03	10.83	24.54
Welfare	0.34	0.54	1.04	2.24

Notes: All results are measured in percentage change from the initial steady state before the reform. When dividend tax and capital gains tax are equal, firms are indifferent between dividends and equity issuance, hence the N/A.

Figure 8: Original Table 6 of Gourio and Miao (2010)
TABLE 6—AGGREGATE EFFECTS OF THE DIVIDEND TAX REFORM IN THE BASELINE MODEL

	$\tau_d = 0.22$ $\tau_g = 0.20$	$\tau_d = 0.20$ $\tau_g = 0.20$	$\tau_d = 0.15$ $\tau_g = 0.15$	$\tau_d = 0$ $\tau_g = 0$
Capital	0.27	0.52	4.26	13.95
Output	0.58	1.00	2.15	5.04
Consumption	0.38	0.63	1.30	2.91
Dividends	6.23	N/A	N/A	N/A
Equity issuance	40.05	N/A	N/A	N/A
Wage	0.48	0.82	1.72	3.95
Firm value	3.40	5.78	10.52	24.09
Welfare	0.31	0.52	1.04	2.27

Notes: When we change the dividend and capital gains tax rates, we fix all other parameter values as in Table 3. All results are measured in percentage change from the initial steady state before the reform.

Figure 9: Table 7 of Gourio and Miao (2010)
Distribution of Firms across Finance Regimes for $\tau_d = 0.22$ and $\tau_{cg} = 0.20$

	Equity issuance regine	Liquidity constrained regime	Dividend distribution regime
Share of firms	0.288	0.236	0.477
Share of capital	0.174	0.125	0.700
Share of investment	0.604	0.191	0.205
Earnings-Capital Ratio	0.396	0.197	0.180
Investment-Capital Ratio	0.329	0.145	0.028
Average Tobins q	2.497	1.980	1.417

Notes: The share of firms for a regime is equal to the total number of firms in that regime divided by the total number of firms in all regimes. The share of capital (investment) for a regime is equal to the total capital stock (resp. investment) of the firms in that regime divided by aggregate capital stock (investment) of all firms. The earnings-capital ratio for a regime is equal to the earnings of the firms in that regime divided by their total capital stock, i.e., it is capital-weighted. The investment-capital ratio and Tobins q are computed in a similar way.

Figure 10: Original Table 7 of Gourio and Miao (2010)
TABLE 7—DISTRIBUTION OF FIRMS ACROSS FINANCE REGIMES FOR $\tau_d = 0.22$ and $\tau_g = 0.20$

	Equity issuance regime	Liquidity constrained regime	Dividend distribution regime
Share of firms	0.248	0.259	0.493
Share of capital	0.138	0.169	0.693
Share of investment	0.517	0.325	0.158
Earnings-capital ratio	0.415	0.264	0.171
Investment-capital ratio	0.357	0.183	0.022
Average Tobin's q	2.620	2.001	1.406

Notes: The share of firms for a regime is equal to the total number of firms in that regime divided by the total number of firms in all regimes. The share of capital (investment) for a regime is equal to the total capital stock (resp. investment) of the firms in that regime divided by aggregate capital stock (investment) of all firms. The earnings-capital ratio for a regime is equal to the earnings of the firms in that regime divided by their total capital stock, i.e., it is capital-weighted. The investment-capital ratio and Tobin's q are computed in a similar way. Except for τ_d and τ_o, other parameter values are listed in Table 3.

Figure 11: Table 8 of Gourio and Miao (2010)
Productivty Gains from the Dividend Tax Cut

	$\tau_d = 0.25$	$\tau_d = 0.22$	$\tau_d = 0.20$
Percentage change in TFP	0.000	0.389	0.676
Percentage change in Y/L	0.000	0.522	0.853
Correlation between ln(k) and ln(z)	0.435	0.456	0.460
Regression coefficient of ln(k) on ln(z)	1.210	1.284	1.303

Figure 12: Original Table 8 of Gourio and Miao (2010)
TABLE 8—PRODUCTIVITY GAINS FROM THE DIVIDEND TAX CUT

	$\tau_d = 0.25$	$\tau_d = 0.22$	$\tau_d = 0.20$
Percentage change in *TFP*	0.00	0.479	0.721
Percentage change in Y/L	0.00	0.430	0.818
Correlation between ln k and ln z	0.438	0.450	0.457
Regression coefficient of ln k on ln z	1.203	1.268	1.312

Note: When we change the dividend tax rate, we fix all other parameter values as in Table 3.

Figure 13: Table 9 of Gourio and Miao (2010)
Moments for Different Parameter Values

	Data	$\rho = 0.65$	$\rho = 0.85$	$\sigma = 0.1$	$\sigma = 0.3$	$\phi = 0.5$	$\phi = 1.5$
Aggregate dividends/earnings	-	0.301	0.440	0.308	0.431	0.484	0.325
Aggregate new equity/investment	-	0.030	0.350	0.035	0.244	0.422	0.093
Volatility of investment rate	-	0.098	0.223	0.077	0.177	0.252	0.128
Autocorrelation of investment rate	-	0.557	0.681	0.677	0.586	0.588	0.666
Volatility of earnings/capital	-	0.160	0.177	0.079	0.321	0.158	0.186
Autocorrelation of earnings/capital	-	0.553	0.732	0.720	0.595	0.648	0.661

Figure 14: Original Table 9 of Gourio and Miao (2010)
TABLE 9—MOMENTS FOR DIFFERENT PARAMETER VALUES

	Data	$\rho = 0.65$	$\rho = 0.85$	$\sigma = 0.1$	$\sigma = 0.3$	$\psi = 0.5$	$\psi = 1.5$
Aggregate dividends/earnings	0.137	0.290	0.435	0.296	0.413	0.481	0.315
Aggregate new equity/investment	0.130	0.007	0.340	0.010	0.294	0.419	0.069
Volatility of investment rate	0.156	0.098	0.224	0.076	0.208	0.254	0.127
Autocorrelation of investment rate	0.596	0.566	0.683	0.690	0.603	0.588	0.668
Volatility of earnings/capital	0.623	0.160	0.176	0.080	0.273	0.157	0.186
Autocorrelation of earnings/capital	0.791	0.557	0.732	0.720	0.588	0.647	0.662

Note: When we change one parameter value, we fix other parameter values as in Table 3.

Figure 15: Table 10 of Gourio and Miao (2010)

Moments for Different Parameter Values

	Capital	Output	Consumption	Wage
Baseline	4.36	2.14	1.29	1.72
$\rho = 0.65$	3.55	1.31	0.77	1.07
$\rho = 0.85$	5.33	2.25	1.35	1.79
$\sigma = 0.1$	3.82	1.59	0.98	1.21
$\sigma = 0.3$	5.46	2.34	1.49	1.90
$\phi = 0.5$	5.64	2.81	1.70	2.24
$\phi = 1.5$	4.03	1.79	1.07	1.46

Notes: All results are measured in percentage change of model with tax-reform from model before tax-reform.

Figure 16: Original Table 10 of Gourio and Miao (2010)

TABLE 10—SENSITIVITY ANALYSIS OF DIVIDEND TAX REFORM FOR DIFFERENT PARAMETER VALUES

	Capital	Output	Consumption	Wage
Baseline	4.26	2.15	1.30	1.72
$\rho = 0.65$	3.58	1.34	0.78	1.08
$\rho = 0.85$	5.40	2.32	1.38	1.86
$\sigma = 0.1$	3.57	1.48	0.88	1.19
$\sigma = 0.3$	5.36	2.34	1.39	1.88
$\psi = 0.5$	5.72	2.85	1.72	2.28
$\psi = 1.5$	4.06	1.89	1.15	1.50

Notes: When we change one parameter value, we fix other parameter values as in Table 3. All results are measured in percentage change from the initial steady state.