On-line Appendix for "On Average Establishment Size across Sectors and Countries," by Pedro Bento and Diego Restuccia

A Service Sector Establishment Size Data

Table 1 lists each country in the final service sector dataset, the number of industries for which data is available, and the sources from which data have been collected. See Bento and Restuccia (2017) for the corresponding table for manufacturing.

Table 1: List of Countries and Sources

Country	Code	Industries	Sources
Âland Islands	ALA	5	Statistics and Research Âland: Statistical Yearbook of Âland 2010 and www.asub.ax
Albania	ALB	6	Instituti i Statistikave: www.instat.gov.al/en/figures/statistical-databases.aspx
American Samoa	ASM	9	U.S. Census Bureau: U.S. Economic Census 2007
Andorra	AND	8	Departament d'Estadística: www.estadistica.ad
Anguilla	AIA	8	Anguilla Statistics Department: Abstract of Statistics 2000
Argentina	ARG	8	Instituto Nacional de Estadística y Censos: 2005 Economic Census
Aruba	ABW	8	Central Bureau of Statistics: Business Count 2003
Australia	AUS	9	Australian Bureau of Statistics: Counts of Australian Businesses 2007, Labour Force Surveys (Quarterly)
Austria	AUT	8	Statistik Austria: statcube.at
Bahrain	BHR	8	Kingdom of Bahrain Central Informatics Organization: Population, Housing, Buildings, Establishments and Agriculture Census
Bangladesh	BGD	9	Bangladesh Bureau of Statistics: Economic Census 2013
Belgium	BEL	7	OECD's SDBS Structural Business Statistics
Benin	BEN	9	Institut National de la Statistique et de l'Analyse Economique: General Census of Companies
Bosnia and Herzegovina, Federation of	BIH	5	Institute for Statistics of FB&H: Statistical Yearbook 2012
Brazil	BRA	9	Brazilian Institute of Geography and Statistics: Cadastro Central de Empresas
Brunei	BRN	7	Department of Economic Planning and Development: Brunei Darussalam Statistical Yearbook 2010
Bulgaria	BGR	7	Eurostat
Cambodia	KHM	8	National Institute of Statistics: Economic Census 2011
Cameroon	CMR	5	Institut National de la Statistique du Cameroun: Recensement Général des Entreprises 2009

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Country	Code	Industries	Sources
Canada	CAN	9	Statistics Canada: CANSIM
Cape Verde	CPV	9	Instituto Nacional de Estatística: Estatísticas de Empresas - Inquérito Anual ás Empresas 2013
Chad	TCD	8	Institut National de la Statistique, des Etudes Economiques et Démographiques: Recensement Général des Entreprises
Columbia	COL	4	Departamento Administrativo Nacional de Estadística: www.dane.gov.co
Croatia	CRV	8	Eurostat and Central Bureau of Statistics: Statistical Yearbook 2009
Cyprus	CYP	7	Eurostat
Czech Republic	CZE	7	OECD's SDBS Structural Business Statistics
Denmark	DNK	7	OECD's SDBS Structural Business Statistics
Dominican Republic	DNK	7	Oficina Nacional de Estadística: Registro Nacional de Establecimientos
Ecuador	ECU	8	Instituto Nacional Estadística y Censos: National Economic Census 2010
El Salvador	SLV	9	Ministerio de Economica: Tomo I de los VII Censos Económicos Nacionales 2005
Estonia	EST	7	Statistics Estonia: Statistical Yearbook 2011 and pub.stat.ee
Faroe Islands	FRO	7	Statistics Faroe Islands: www.hagstova.fo
Finland	FIN	7	Statistics Finland: www.stat.fi
France	FRA	8	Eurostat
French Guiana	GUF	7	Institut national de la statistique et des études économiques: L'Enquête Annuelle d'Entreprise en Guyane en 2006 and Tableaux Économiques Régionaux Guyane
French Polynesia	PYF	8	Institut de la Statistique de la Polynésie Française: www.ispf.pf and Les entreprises polynésiennes en 2010
FYR Macedonia	MKD	7	State Statistical Office: www.stat.gov.mk
Georgia	GEO	8	National Statistics Office of Georgia: Statistical Yearbooks 2008 and www.geostat.ge
Germany	DEU	7	Eurostat and OECD's SDBS Structural Business Statistics
Ghana	GHA	9	Ghana Statistical Service: Integrated Business Establishment Survey 2014
Greece	GRC	7	Eurostat and OECD's SDBS Structural Business Statistics
Greenland	GRL	7	Statistics Greenland: bank.stat.gl
Guadeloupe	GLP	4	Institut national de la statistique et des études économiques: Caractéristiques des entreprises et établissements and L'Enquête Annuelle d'Entreprise: Les Services en Guadeloupe en 2006
Guam	GUM	9	U.S. Census Bureau: U.S. Economic Census 2007
Guernsey	GGY	9	States of Guernsey: Facts and Figures 2016: Supplementary Data

Table 1: List of Countries and Sources

Country	Code	Industries	Sources
Hong Kong	HKG	8	Census and Statistics Department: 2007 Annual Surveys of Wholesale, Retail, Import and Export Trades, Restaurants, Hotels, Building, Construction, Real Estate Sectors, Transport and Related Services, Storage, Communication, Banking, Financing, Insurance, and Business Services
Hungary	HUN	7	Eurostat and OECD's SDBS Structural Business Statistics
Iceland	ISL	8	Eurostat
India	IND	8	Central Statistics Office: 2005 Economic Census
Iran	IRN	4	Statistical Centre of Iran: Statistical Yearbook 1389
Ireland	IRL	8	Central Statistics Office: www.cso.ie
Israel	ISR	9	Eurostat and OECD's SDBS Structural Business Statistics
Italy	ITA	7	Eurostat and OECD's SDBS Structural Business Statistics
Japan	JPN	8	Statistics Japan: Establishment and Enterprise Census 2006
Jordan	JOR	8	Department of Statistics: www.dos.gov.jo
Kazakhstan	KAZ	9	Committee on Statistics: www.stat.gov.kz
Kenya	KEN	9	National Bureau of Statistics: Micro, Small and Medium Enterprises (MSMEs) Basic Report 2016 and Statistical Abstract 2016
Korea	KOR	8	Statistics Korea: Censuses on Establishments 2007
Kosovo	KSV	6	Statistical Agency of Kosovo: Statistical Register of Business
Kuwait	KWT	8	Central Statistical Bureau: Annual Surveys of Establishments 2007
Kyrgyzstan	KGZ	9	National Statistical Committee of Kyrgyz Republic: stat.kg
Laos	LAO	9	Lao Statistics Bureau: Economic Census 2006
Latvia	LVA	7	Eurostat
Liechtenstein	LIE	9	Statistical Office: Statistical Yearbooks 2014
Lithuania	LTU	7	Eurostat
Luxembourg	LUX	7	Eurostat
Macau	MAC	5	Statistics and Census Service: Statistical Yearbook 2007
Malawi	MWI	4	National Statistical Office: Statistical Yearbook 2005
Malaysia	MYS	3	Department of Statistics Malaysia: Census of Distributive Trade in 2014
Maldives	MDV	8	Department of National Planning: Economic Survey 2007/2008
Malta	MLT	7	Eurostat
Mauritius	MUS	8	Statistics Mauritius: Censuses of Economic Activity 2002, 2007, Phases I and II
Mexico	MEX	9	Instituto Nacional de Estadstica y Geografía: Censos Economicos 2009
Micronesia	FSM	8	Division of Statistics: www.sboc.fm
Moldova	MDA	8	Statistica Moldovei: www.statistica.md
Monaco	MCO	3	Monaco Statistics: Commerce Observatory 2008
Mongolia	MNG	8	National Statistical Office: Mongolian Statistical Yearbook 2011

Table 1: List of Countries and Sources

Country	Code	Industries	Sources
Montenegro	MNE	8	Statistical Office of Montenegro: www.monstat.org and Statistical Yearbook 2010
Morocco	MAR	9	Haut-Commissariat au Plan du Maroc: 2001-2 Economic Census
Netherlands	NLD	7	Eurostat
New Caledonia	NCL	8	Institut de la Statistique et des Etudes Economique: www.isee.nc
New Zealand	NZL	9	Statistics New Zealand: www.stats.govt.nz
Nicaragua	NIC	9	Instituto Nacional de Información de Desarrollo: Urban Economic Census
Norfolk Island	NFK	2	Australian Business Statistics: www.ausstats.abs.gov.au
Northern Mariana Islands	MNP	9	U.S. Census Bureau: U.S. Economic Census 2007
Norway	NOR	7	Eurostat
Palau	PLW	8	Office of Planning and Statistics: 2012 Economic Indicators
Palestinian Territories	PSE	9	Palestinian Central Bureau of Statistics: Establishment Censuses 2007
Panama	PAN	8	Instituto Nacional de Estadística y Censo: Economic Census 2012
Paraguay	PRY	9	Direccin General de Estadística, Encuestas y Censos: National Economic Census 2011
Peru	PER	9	Instituto Nacional de Estadística e Informática: IV Censo National Economico 2008
Philippines	PHL	9	National Statistics Office: NSO's 2012 List of Establishments
Poland	POL	7	Eurostat
Portugal	PRT	7	Eurostat
Puerto Rico	PRI	9	U.S. Census Bureau: U.S. Economic Census 2007
Qatar	QAT	9	Ministry of Development Planning and Statistics: Establishment Censuses 2008
Romania	ROU	7	National Institute of Statistics: Statistical Yearbooks 2007-2009
Russia	RUS	7	Federal State Statistics Service: Industry of Russia 2009, and Small and Medium Businesses in Russia 2015
Rwanda	RWA	9	National Institute of Statistics of Rwanda: Establishment Census 2011
Samoa	WSM	8	Bureau of Statistics: www.sbs.gov.ws
San Marino	SMR	8	Ufficio Informatica, Tecnologia, Dati e Statistica: Il Bilancio di Previsione per l?Esercizio Finanziario 2010
São Tomé and Príncipe	STP	7	Instituto Nacional de Estatísticas de São Tomé e Príncipe: Business Statistics 2007
Saudi Arabia	SAU	9	Central Department of Statistics and Information: 2010 Economic Census

Table 1: List of Countries and Sources

Country	Code	Industries	Sources
Serbia	SRB	8	Statistical Office of the Republic of Serbia: Classification Units in the Republic of Serbia 2012, Employees in the Republic of Serbia 2012, and Labor Force Survey 2011
Sierra Leone	SLE	8	Statistics Sierra Leone: Report of the Census of Business Establishments 2005
Singapore	SGP	8	Department of Statistics Singapore: Yearbook of Statistics 2012, 2014, 2015
Slovak Republic	SVK	9	Statistical Office of the Slovak Republic: slovak.statistics.sk and Statistical Yearbook 2013
Slovenia	SVN	7	Eurostat
Spain	ESP	7	Eurostat
Sri Lanka	LKA	7	Department of Census and Statistics - Sri Lanka: Census of Trade and Services 2003-2006
Svalbard	SJM	9	Statistics Norway: www.ssb.no
Sweden	SWE	7	Eurostat
Switzerland	CHE	5	Swiss Statistics: www.bfs.admin.ch/bfs/portal/en/index.html
Taiwan	TWN	9	National Statistics: Industry, Commerce and Service Censuses 2006
Thailand	THA	7	National Statistical Office: Business Trade and Industrial Census 2008 and 2012
Tunisia	TUN	8	Institut National de la Statistique: www.ins.nat.tn
Turkey	TUR	8	OECD's SDBS Structural Business Statistics
Uganda	UGA	8	Uganda Bureau of Statistics: Report on the Census of Business Establishments 2010/2011
Ukraine	UKR	9	State Statistics Service of Ukraine: www.ukrstat.gov.ua
United Arab Emirates	ARE	6	National Bureau of Statistics: www.uaestatistics.gov.ae
United Kingdom	GBR	7	Eurostat
United States	USA	9	U.S. Census Bureau: U.S. Economic Census 2007
Uruguay	URY	8	Instituto Nacional de Estadística: Directory of Companies and Establishments
U.S. Virgin Islands	VIR	9	U.S. Census Bureau: U.S. Economic Census 2007
Venezuela	VEN	8	Instituto Nacional de Estadística: IV Censo Económico
Vietnam	VNM	9	General Statistics Office: Survey of Business Establishments Producing Non-Agricultural Individual Period 2005-2015
Yemen	YEM	8	Central Statistical Organization: Services Survey Report 2004, Transport and Telecom Survey Report 2003, and Internal Trade Survey Results 2004

B Other Potential Sources of Correlated Wedges

Several papers since Restuccia and Rogerson (2008) and Hsieh and Klenow (2009) have emphasized potential sources of measured dispersion in revenue productivity (TFPR) other than policy distortions. More relevant for the measure of distortions we use are potential mechanisms that may account for the empirical correlation between wedges and firm productivity. The mechanisms can be broadly categorized into three groups. First, mechanisms that are technological and not the result of policy. Examples include the presence of adjustment frictions (for inputs to production), uncertainty about productivity when making input decisions, overhead costs, markups that vary with productivity, and endogenous productivity choice. Second, the presence of measurement error in the data. Third, mechanisms involving some type of model misspecification. In what follows, we consider potential sources of measured correlated wedges that are technological by extending our baseline model and assessing their quantitative relevance.

We consider a dynamic version of the model in Section 4 extended to allow for time-to-build with overhead costs. We use it along with moments from the employment size distribution of U.S. manufacturing to assess the quantitative importance of other sources of correlated wedges. We abstract from variable markups as they have been shown to generate only a small fraction of the difference in observed correlated wedges across countries (Hsieh and Klenow, 2014; Peters, 2019). In particular, Peters (2019) shows that variable markups can generate correlated wedges across firms but not differences in this correlation across countries. Hsieh and Klenow (2014) compare economies where variable markups range from 0 to 50 percent (the monopoly markup) depending on productivity and find estimated correlations (γ) of only 3 percent.

Firms must choose their labor input one period in advance before knowing the outcome of an uncertain productive shock (Bartelsman et al., 2013). We assume that producers must incur an overhead cost each period, equal to $z_{-1}(1-\tau_{-1})^{\frac{1}{1-\alpha}} \cdot c_P$ units of labor, where z_{-1} is related to the productivity of the firm in the previous period, τ is a tax rate on firm's output, and the overhead labor is assumed to be included in measures of firm employment. Denote a firm's productive labor by ℓ_P and its total labor input by $\ell = \ell_P + z_{-1}(1-\tau_{-1})^{\frac{1}{1-\alpha}} \cdot c_P$. Firms produce a quantity y of a homogenous good according to $y = z^{1-\alpha}\ell_P^{\alpha}, \quad \alpha \in (0,1)$. Rather than a fixed overhead cost that is common across firms as in Bartelsman et al. (2013), we specify the overhead cost as increasing in firm's productivity because a fixed overhead cost would have to be insignificant to be consistent with the presence of very small establishments in the data (Hsieh and Klenow, 2014). Note that one interpretation of this overhead cost is as a firm's labor cost of increasing productivity, where this labor is counted in the firm's measure of employment. We follow Atkeson and Burstein (2010) in assuming that a firm's productivity increases from one period to the next by a factor $exp(\Delta(1-\alpha))$ with probability q, and by $exp(-\Delta(1-\alpha))$ with probability $1-q$. Firms face an effective tax rate τ on output that is correlated with productivity as in the benchmark model: $1-\tau = z^{-\gamma(1-\alpha)}$. The presence of τ in the overhead cost implies that this cost is increasing in a firm's profitability, rather than its productivity (Asker et

al., 2014). We discuss below the implications of this assumption. This extended setup allows us to consider uncertainty, overhead costs, endogenous productivity choice, and policy distortions, as well as interactions between each of these potential sources of correlated wedges when estimating γ in the data.

The expected operating profits of a firm making its labor decision is;

$$\pi = z_{-1}^{(1-\alpha)(1-\gamma)} \ell_P^{\alpha} \cdot \Psi - w \cdot (\ell_P + z_{-1}^{1-\gamma} c_P), \tag{1}$$

$$\Psi \equiv q \cdot exp(\Delta(1-\alpha)(1-\gamma)) + (1-q) \cdot exp(-\Delta(1-\alpha)(1-\gamma)),$$

where w is the real wage and the subscript -1 refers to the previous period.

Taking wages as given, from a firm's first-order conditions we obtain:

$$\ell_P = z_{-1}^{1-\gamma} \left(\frac{\alpha}{w}\right)^{\frac{1}{1-\alpha}} \Psi^{\frac{1}{1-\alpha}}, \tag{2}$$

$$y = z_{-1}^{1-\alpha\gamma} \left(\frac{z}{z_{-1}}\right)^{1-\alpha} \left(\frac{\alpha}{w}\right)^{\frac{\alpha}{1-\alpha}} \Psi^{\frac{\alpha}{1-\alpha}}, \tag{3}$$

$$TFPR = \frac{y}{\ell} \propto z_{-1}^{\gamma(1-\alpha)} \left(\frac{z}{z_{-1}}\right)^{1-\alpha}. \tag{4}$$

Three points are worth noting about $TFPR$ in equation (4). First, because firms must choose productive labor one period in advance, $TFPR$ is higher (lower) when firms experience a positive (negative) productivity shock. Second, in the absence of correlated distortions ($\gamma = 0$), $TFPR$ does *not* depend on the level of a firm's productivity. Third, $TFPR$ is not affected by the presence of overhead costs, which follows from the assumptions that the overhead cost is directly affected by γ and is increasing in the productivity of the firm. Recall that requiring overhead costs to increase with productivity is necessary to reconcile very small firms in the data. If overhead costs are instead interpreted as the cost of increasing productivity, as in Atkeson and Burstein (2010), then they must also be increasing in productivity in order to keep productivity growth from exploding as firms become larger.

We approximate the establishment size distribution as a log-normal distribution with mean μ and standard deviation σ. We then use three moments from the distribution of employment across U.S. manufacturing establishment in order to assess the impact of different potential sources of correlated wedges on empirical estimates of correlated distortions (γ). The three moments are: (a) an average annual growth rate of employment across establishments of 5 percent (Hsieh and Klenow, 2014); (b) a standard deviation of employment growth across establishments of 0.25 (Atkeson and Burstein, 2010); and (c) a standard deviation of (logged) employment across establishments of 1.75 (Kondo et al., 2019).

Assuming $\gamma = 0$ in the U.S. data for simplicity, the model analogues to the three moments just

described are:

$$\mathbb{E}\left(\frac{\ell}{\ell_{-1}}-1\right)=q\cdot exp(\Delta)+(1-q)\cdot exp(-\Delta)-1,$$

$$s.d.\left(\frac{\ell}{\ell_{-1}}-1\right)=\left(q\cdot(exp(\Delta)-1)^2+(1-q)\cdot(exp(-\Delta)-1)^2-\mathbb{E}\left(\frac{\ell}{\ell_{-1}}-1\right)^2\right)^{1/2},$$

$$s.d.(\ell)=s.d.(ln(z))=\sigma.$$

The parameter values required to obtain the empirical targets are $\Delta=0.248$, $q=0.538$, $\sigma=1.323$.

We now simulate distributions of $\ln(TFPR)$ and $(1-\alpha)\ln(z)$ for two cases. First, we assume $\gamma=0$, so variation in $TFPR$ arises solely from uncertainty. Second, we additionally assume $\gamma=0.7$ to assess how the estimate of γ is affected by uncertainty in distorted economies. In each case, we regress $\ln(TFPR)$ on productivity $(1-\alpha)\ln(z)$ to obtain an estimate of $\hat{\gamma}$. We also calculate measures of dispersion in $\ln(TFPR)$. For these estimates, we abstract from new entrants, as we have no good measures of dispersion in employment across entrants. If entrants make decisions with knowledge of their productivity, then abstracting from entrants biases our estimates of γ upwards.

Table 2 reports the results. In column 1, when $\gamma=0$, we obtain $\hat{\gamma}=0.02$ and $\text{SD}(\ln TFPR)=0.08$. Uncertainty with time to build does not generate sufficient quantitative variation to explain the data, in particular, while uncertainty does generate correlated wedges, the variation in productivity growth is small relative to the variation in productivity levels across establishments. In column 2, when $\gamma=0.7$, we obtain $\hat{\gamma}=0.71$ and the upward bias in the estimate of γ is smaller than in the absence of distortions.

Table 2: Sources of Correlated Wedges and $\hat{\gamma}$

	Uncertainty	Uncertainty and Corr. Distortions	Uncertainty and Adj. Cost	Uncertainty, Adj. Cost, and Corr. Distortions
$\hat{\gamma}$	0.02	0.71	0.03	0.71
$\text{SD}(\ln TFPR)$	0.08	0.42	0.11	0.43

Figure 1 illustrates the relationship between $\ln(TFPR)$ and (log) productivity across establishments for the case of no distortions ($\gamma=0$) in the first panel and with distortions ($\gamma=0.70$) in the second panel.

We specified overhead cost to increase with firm profitability rather than productivity and find no effect of overhead costs on $\hat{\gamma}$. If instead we assume that overhead cost is related to productivity as $z_{-1}\cdot c_P$, then logged revenue productivity would be:

$$TFPR=\frac{y}{\ell}\propto\frac{z_{-1}^{\gamma(1-\alpha)}\left(\frac{z}{z_{-1}}\right)^{1-\alpha}}{\left[1+z_{-1}^{\gamma}c_P\left(\frac{\alpha}{w}\right)^{\frac{-1}{1-\alpha}}\Psi^{\frac{-1}{1-\alpha}}\right]}. \tag{5}$$

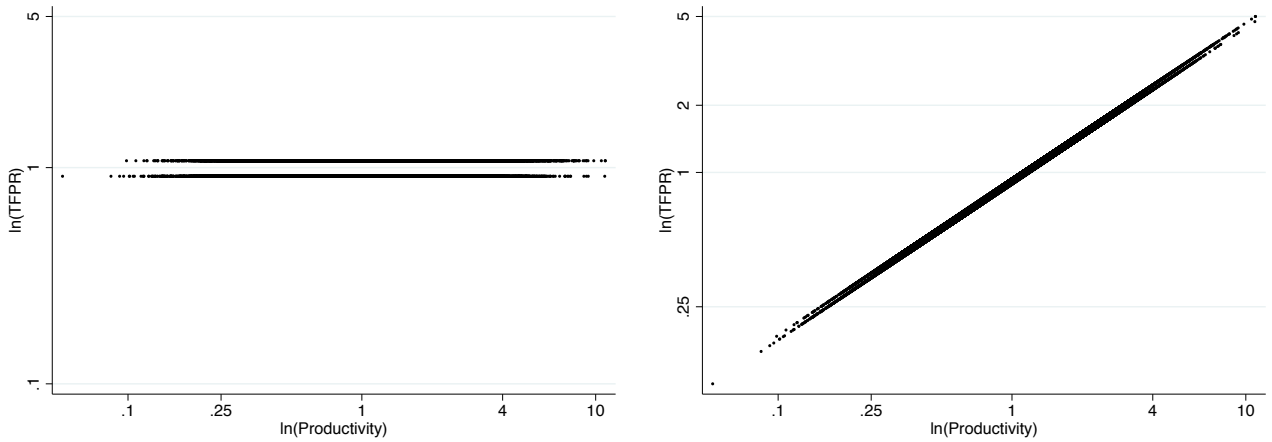

Figure 1: Measured Distortions and Productivity across Establishments

Notes: The figure reports $\ln(TFPR)$ against (log) productivity across establishments under uncertainty. The first panel is the case with no correlated distortions ($\gamma = 0$), whereas in the second panel distortions feature $\gamma = 0.7$

Since z_{-1}^{γ} appears in the denominator of the above expression, the estimate of γ in this case would result in a *lower* estimate than in our baseline case.

We now consider the presence of adjustment frictions. We continue to assume that firms choose labor before realizing productivity but abstract from overhead costs. Adjustment frictions generate inaction regions on firm's decisions even after realizing productivity (Caballero et al., 1995). Rather than modeling these frictions explicitly, we instead assume all firms adjust their labor input every two periods. A delay of one year arguably reflects extreme adjustment frictions (Cooper and Haltiwanger, 2006). Combined with uncertainty this assumption implies that firms take into account two future shocks to productivity when choosing their labor input.

When adjusting labor, firms choose labor ℓ to maximize discounted profits for the next two periods. Expected profits are;

$$\pi = z_{-1}^{(1-\alpha)(1-\gamma)} \ell^{\alpha} \cdot \Psi - w\ell, \tag{6}$$

$$\pi_{+1} = z_{-1}^{(1-\alpha)(1-\gamma)} \ell^{\alpha} \cdot \Psi_{+1} - w\ell,$$

$$\Psi_{+1} \equiv q^2 \cdot exp(2\Delta(1-\alpha)(1-\gamma)) + 2q(1-q) + (1-q)^2 exp(-2\Delta(1-\alpha)(1-\gamma)),$$

where the subscript $+1$ refers to the future period, and Ψ is defined as before. Let R denote the real interest rate used for discounting. Choosing ℓ to maximize the discounted value of the above expected profits results in the following choice of labor;

$$\ell = z_{-1}^{1-\gamma} \left(\frac{\alpha}{w}\right)^{\frac{1}{1-\alpha}} \left(\frac{\Psi + \Psi_{+1}(1+R)^{-1}}{2}\right)^{\frac{1}{1-\alpha}}. \tag{7}$$

Output in each period is therefore equal to;

$$y = z_{-1}^{1-\alpha\gamma} \left(\frac{z}{z_{-1}}\right)^{1-\alpha} \left(\frac{\alpha}{w}\right)^{\frac{\alpha}{1-\alpha}} \left(\frac{\Psi + \Psi_{+1}(1+R)^{-1}}{2}\right)^{\frac{\alpha}{1-\alpha}}, \tag{8}$$

$$y = z_{-1}^{1-\alpha\gamma} \left(\frac{z_{+1}}{z_{-1}}\right)^{1-\alpha} \left(\frac{\alpha}{w}\right)^{\frac{\alpha}{1-\alpha}} \left(\frac{\Psi + \Psi_{+1}(1+R)^{-1}}{2}\right)^{\frac{\alpha}{1-\alpha}}. \tag{9}$$

TFPR in the two periods is;

$$TFPR = \frac{y}{\ell} \propto z_{-1}^{\gamma(1-\alpha)} \left(\frac{z}{z_{-1}}\right)^{1-\alpha}, \tag{10}$$

$$TFPR_{+1} = \frac{y_{+1}}{\ell} \propto z_{-1}^{\gamma(1-\alpha)} \left(\frac{z_{+1}}{z_{-1}}\right)^{1-\alpha}. \tag{11}$$

We simulate distributions of $\ln(TFPR)$ and $(1-\alpha)\ln(z)$ for the cases of no distortions $\gamma = 0$ and distortions that feature $\gamma = 0.7$. We assume that half of all firms adjust labor each period. We use the same calibrated values for Δ, q, and σ, under the assumption that firms face uncertainty but not significant adjustment costs or correlated distortions in the benchmark economy calibrated to U.S. data. The results for $\hat{\gamma}$ and the standard deviation of $\ln(TFPR)$ are reported in the last two columns of Table 2. Column 3 shows that combining adjustment costs with uncertainty generates an estimate for γ marginally larger than in the case with just uncertainty. Dispersion in $TFPR$ is also somewhat higher (0.11 compared to 0.08). Column 4 shows that the presence of both uncertainty and adjustment frictions generates almost no bias in the estimated γ.

Our analysis provides intuition for the results in David and Venkateswaran (2019) who use a rich structural model to infer the contributions of several potential sources of dispersion in $TFPR$ exploiting micro panel data from manufacturing firms in the United States and China. They report that adjustment and informational frictions can account for 18 percent of the dispersion observed in the United States, but only 11 percent in China. This is consistent with our findings. In the U.S. data, where Hsieh and Klenow (2014) estimate a γ equal to 0.09, the small amount of dispersion generated by adjustment frictions and uncertainty is a significant portion of the relatively low total dispersion. In China, where Hsieh and Klenow (2007) estimate a γ equal to 0.43, total dispersion should be higher. Our framework suggests that dispersion due to these sources should therefore reflect a smaller fraction of total dispersion, as found in David and Venkateswaran (2019). Also consistent with our findings, David and Venkateswaran (2019) show that unexplained dispersion in $TFPR$ that is correlated with firm productivity is responsible for 47 percent of total dispersion in China but only 14 percent in the United States.

Our analysis together with that of David and Venkateswaran (2019) provide some reassurance that the estimated variation of correlated distortions γ across sectors and countries in Section 3 are reasonably robust to relevant changes in the economic environment to accommodate other sources of measured wedges across establishments. Nevertheless, we emphasize that our analysis has only considered mechanisms that are technological in nature. Measurement error and model mis-specification

can also be a concern. Although we do not use measures of dispersion in our analysis, measurement error in the WBES data could generate a spurious relationship between measured $TFPR$ and firm-level productivity. In Bento and Restuccia (2017), we discuss that measurement error does not seem to generate systematic differences in our measure of correlated distortions across countries, but clearly more work is needed in analyzing the potential role of this factor (Bils et al., 2019). Model specification can also be a source of bias in our estimates of γ. For instance, Foster et al. (2015), Foster et al. (2016), Haltiwanger et al. (2018), and Eslava and Haltiwanger (2019) emphasize how model misspecification, such as heterogeneity in the curvature of profits across firms not accounted for in the model, can generate variation in measured $TFPR$ and hence bias the estimated relationship between measured $TFPR$ and productivity. More work along these lines is needed to provide more precise estimates of firm productivity and correlated distortions.

C Determinants of Establishment Size, Raw Data

We re-estimate the empirical determinants of average establishment size in the service sector and the relative size ratio across sectors using only the raw data. We confirm the main findings using our baseline imputed data. We use the pooled raw size data for service industries, controlling for fixed effects related to both industry and the data used to measure size as described in Section 2.3. The results of these regressions are reported in Tables 3 and 4. We confirm that all of the estimated coefficients are of the same sign and of similar magnitude.

Table 3: Determinants of Average Establishment Size in Services, Raw Data

Panel A: Bivariate regressions						
Dependent variable: Average establishment size in services						
Independent variables:						
GDP per capita	0.32***					
	(0.02)					
Services employment		-0.00				
		(0.02)				
External financing			0.29***			
			(0.03)			
Firing costs				-0.19***		
				(0.05)		
Openness to trade					0.34***	
					(0.04)	
Correlated distortions (Serv.)						-1.16***
						(0.18)
Country-Industries	1189	1189	525	525	978	650
R^2	0.40	0.23	0.33	0.21	0.28	0.33
Panel B: Multivariate regressions						
Dependent variable: Average establishment size in services						
Independent variables:						
External financing	0.19***	0.22***				
	(0.04)	(0.04)				
Firing costs	-0.13**		-0.16***			
	(0.06)		(0.05)			
Openness to trade		0.18***	0.14***	0.21***		
		(0.06)	(0.05)	(0.04)		
Correlated distortions (Mnfg.)				-1.10**		
				(0.18)		
Country-Industries	388	525	510	620		
R^2	0.28	0.35	0.22	0.36		

Notes: All variables logged, except for correlated distortions. See the text for the definition of variables and sources. Robust standard errors in parentheses. ***, **, and * refer to one, five, and ten percent levels of significance.

Table 4: Determinants of Size Ratio Manufacturing to Services, Raw Data

Dependent variable: Ratio of average size manufacturing to services						
Independent variables:						
GDP per capita	0.03					
	(0.03)					
Employment ratio (M/S)		0.03				
		(0.13)				
External financing			0.16***			
			(0.04)			
Firing costs				-0.05		
				(0.05)		
Openness to trade					-0.03	
					(0.04)	
Correlated distortions gap (M-S)						-1.92***
						(0.20)
Country-Industries	1105	892	496	518	934	622
R^2	0.24	0.27	0.33	0.29	0.28	0.39

Notes: All variables logged, except for correlated distortions. See the text for the definition of variables and sources. Robust standard errors in parentheses. *** refers to a one percent level of significance.

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