

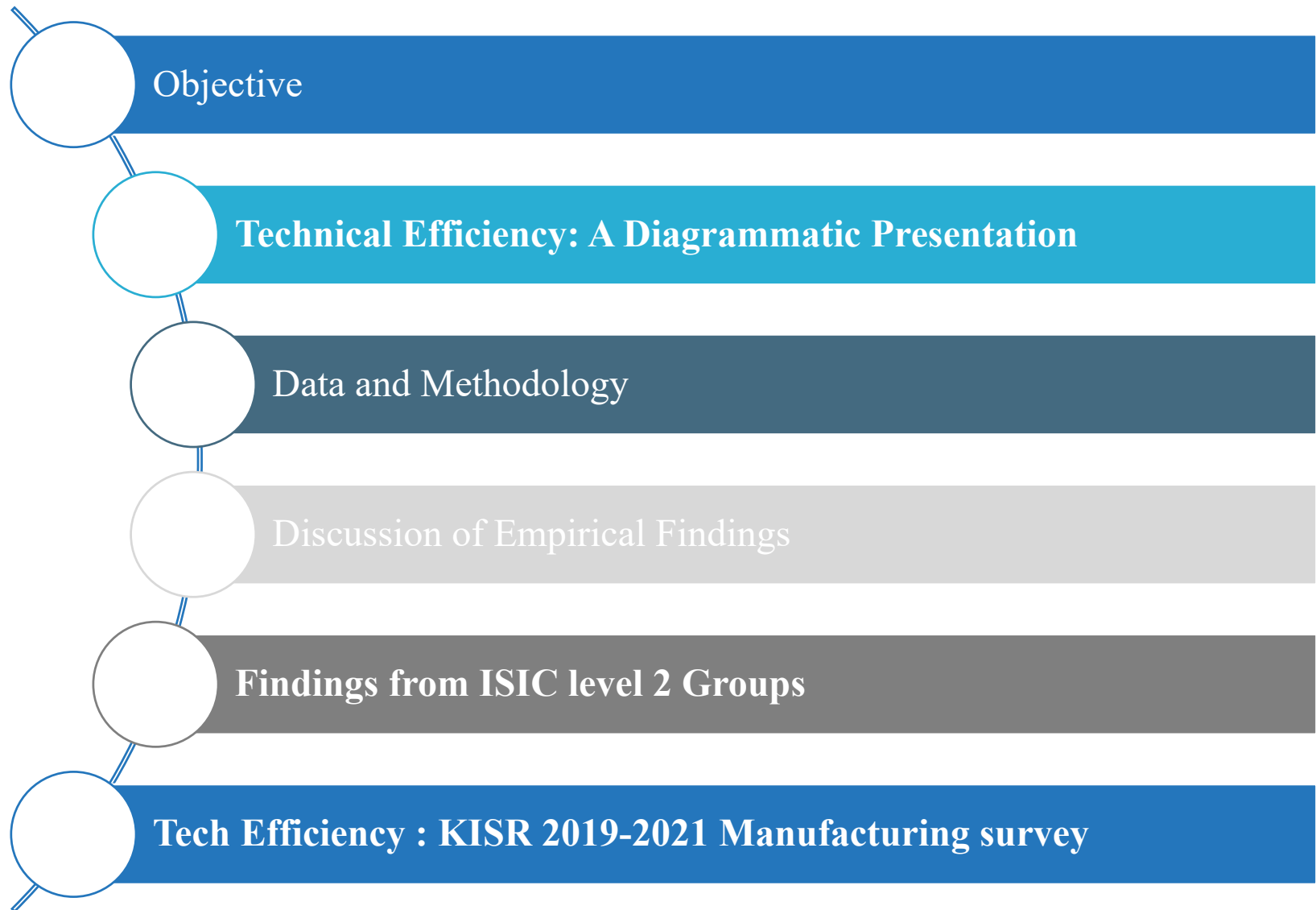
Economic Policy and the Stunted Development of Kuwait's Private Sector: Evidence Based on Stochastic Frontier Panel Model of Firm-level Technical Efficiency Estimates (KFAS Grant: PR18-17IC-03)

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Outline



Objectives

Questions and Hypotheses

What is the level of technical efficiency at ISIC level 2?

Is technical inefficiency time-invariant?

Impact of firm heterogeneity on technical efficiency;

Sources of technical inefficiency

Estimates derived using Greene's true random stochastic frontier model. Data are: CSB 2003-2019. Plus data from KISR's 2021-2022 1000 company survey.

Implications of the findings to Kuwait's transformative transition strategy.

Table 1. Industrial Activities Characteristics According to ISIC2, 2019

isic2 groups	isic2 groups description	Value Added (000 KD)	Number of firms	Number of Kuwaiti workers	Number of Non Kuwaiti workers	Number of workers not Including the Owners	Number of workers Including the Owners
x1	Oil and Gas	17,539,184	9	16,967	11,466	28,433	28,433
x2	Metal / Non Metallic Manufacturing	228,487	1,001	513	28,103	28,616	28,621
x3	Paper and Publishing	77,292	169	369	8,356	8,725	8,743
x4	Apparel and Textile Manufacturing	83,659	2,911	38	18,306	18,344	18,348
x5	Food Manufacturing	191,296	588	647	23,327	23,974	23,982
x6	Wood and Furniture	48,451	629	108	8,464	8,573	8,588
x7	chemical and rubber	619,123	85	1,325	12,923	14,248	14,254
x8	Transport equipment	88,364	16	204	15,975	16,179	16,181
x9	Machinery	138,210	55	331	13,765	14,096	14,100
x10	Recycling	6,024	3	21	2,286	2,307	2,307
x11	Construction	1,129,708	1,226	3,079	182,343	185,422	186,111
x12	Trade	1,752,696	25,644	5,227	185,223	190,451	190,964
x13	Restaurants & hotels	400,005	2,656	1,380	53,815	55,196	55,215
x14	transport	1,274,740	557	3,517	64,103	67,620	67,681
x15	leasing	92,176	219	81	3,352	3,432	3,435
x16	telecommunication and IT	1,549,535	85	1,060	19,578	20,637	20,643
x17	Education and Research	255,681	152	1,122	20,187	21,309	21,324
x18	Finance	3,803,211	264	16,886	20,816	37,702	37,704
x19	Real estate	613,727	1,019	1,316	12,013	13,329	13,630
x20	Advertising\legal	263,899	1,708	1,902	55,079	56,982	57,190
x21	Recreational activities	49,523	122	374	3,152	3,526	3,527
x22	Community serv	181,599	3,309	419	48,622	49,041	49,049
x23	Health and other organization	257,054	151	707	9,682	10,389	10,424

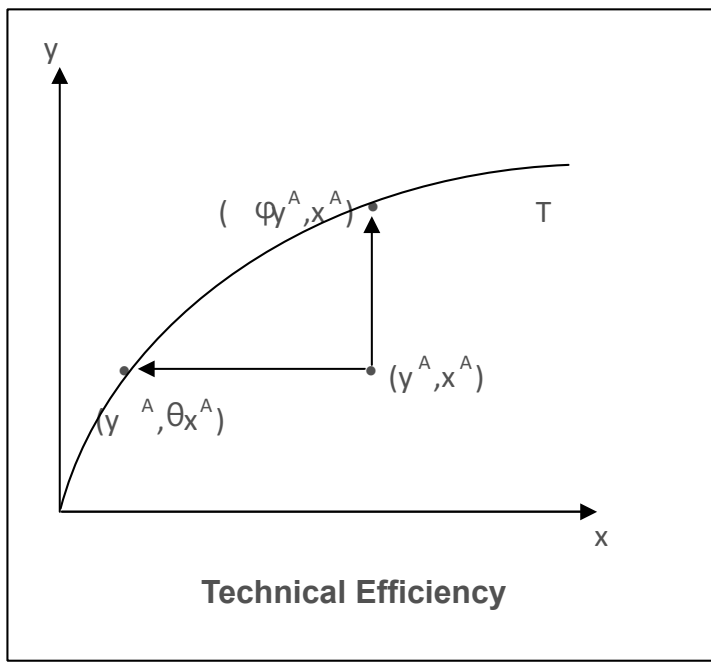
Technical Efficiency: A Diagrammatic Presentation

Estimation

OLS: $q_i = \beta_0 + \beta_1 x_i + v_i$

Deterministic: $q_i = \beta_0 + \beta_1 x_i - u_i$

SFA: $q_i = \beta_0 + \beta_1 x_i + v_i - u_i$



$$q_i = \exp(\beta_0 + \beta_1 \ln x_i) \times \exp(v_i) \times \exp(-u_i)$$

= *Deterministic Component* × *Noise* × *Inefficiency*

Data and Methodology

The true random effect panel model as developed by Greene (2005), TRE. It provides reliable efficiency estimates and is the one we use for conducting our efficiency analysis below.

The Greene model is applied to:

- 1.CSB Data on Establishment Surveys 2003-2019;
- 2.KISR's 1000 Company Panel Survey Data 2019-2021.

All models for twenty-two ISIC2 Groups were estimated using the Maximum Likelihood Methods (ML).

Discussion of Empirical Findings

Table 2. Technical Efficiency Estimates for ISIC Groups 2 to 10

	Met/Nomet	Pap/Pub	App/Text	Food	Furn.	Chem/Rub	Trans.	Machine	Const.
2003	.709	.547	.562	.73	.73	.583	.685	.69	.825
2004	.712	.587	.566	.731	.733	.6	.673	.681	.824
2005	.722	.609	.577	.739	.743	.617	.723	.708	.824
2006	.729	.608	.591	.745	.738	.619	.713	.74	.829
2007	.735	.601	.597	.735	.746	.672	.72	.727	.829
2008	.735	.607	.581	.75	.743	.689	.746	.702	.831
2009	.741	.595	.576	.741	.746	.611	.698	.682	.83
2010	.738	.607	.574	.738	.747	.611	.724	.687	.832
2011	.754	.643	.608	.756	.752	.618	.723	.703	.836
2012	.743	.626	.628	.745	.743	.618	.736	.707	.84
2013	.762	.664	.643	.765	.753	.634	.745	.756	.843
2014	.762	.663	.629	.759	.761	.656	.729	.726	.843
2015	.763	.645	.635	.762	.755	.657	.727	.719	.849
2016	.763	.614	.61	.765	.759	.61	.758	.716	.848
2017	.755	.595	.584	.759	.749	.604	.726	.689	.846
2018	.752	.576	.584	.746	.759	.632	.692	.705	.85
2019	.746	.553	.576	.749	.755	.612	.663	.701	.847

Table 3. Technical Efficiency for ISIC Groups 12 to 23

	Trade	Rest	Trans	Lease	Tel/IT	Ed/res	Fin	Realest	Other.	Recr.	Com.	Health
2003	.681	.665	.861	.662	.719	.661	.371	.58	.648	.562	.66	.59
2004	.682	.668	.857	.675	.731	.676	.374	.583	.655	.579	.685	.604
2005	.683	.655	.86	.666	.732	.679	.43	.599	.66	.578	.658	.607
2006	.685	.657	.864	.664	.742	.645	.44	.598	.676	.565	.649	.601
2007	.694	.645	.865	.672	.755	.667	.499	.608	.675	.559	.636	.633
2008	.688	.661	.866	.635	.763	.648	.479	.604	.68	.563	.65	.628
2009	.68	.652	.865	.661	.762	.654	.428	.591	.675	.574	.64	.632
2010	.683	.659	.867	.656	.764	.654	.4	.602	.682	.554	.627	.633
2011	.692	.674	.871	.676	.755	.71	.411	.599	.695	.607	.647	.68
2012	.693	.664	.88	.674	.763	.708	.407	.62	.721	.642	.681	.696
2013	.711	.682	.883	.691	.782	.73	.452	.644	.735	.706	.699	.697
2014	.713	.684	.885	.692	.758	.741	.476	.62	.749	.657	.678	.674
2015	.717	.678	.888	.67	.767	.756	.511	.63	.736	.617	.68	.669
2016	.71	.688	.888	.671	.763	.737	.465	.635	.734	.616	.693	.65
2017	.706	.684	.889	.666	.757	.718	.48	.636	.718	.57	.673	.664
2018	.719	.683	.886	.691	.763	.701	.484	.634	.731	.589	.666	.676
2019	.701	.672	.889	.684	.768	.686	.49	.648	.718	.611	.652	.693

The technical efficiency of the food product firms hovered around 73 to 76% over time (table 3). Medium size firms have but only a minute advantage in technical efficiency relative to micro and small sized food product firms as shown in table 6.

Table 4. Panel Stochastic Frontier Model Estimates (TRE Model) ISIC Groups 2 to 7

ISIC2 Groups	(2)	(3)	(4)	(5)	(6)	(7)
Name of ISIC2 Groups	Metallic-nonmetallic	Paper/Pub	Apparel/text	Food Manuf.	Wood/Furn.	Chem/Rubber.
Frontier						
lnemployees	0.273***	0.429***	0.148***	0.180***	0.159***	0.658***
t-stat	(16.48)	(12.40)	(6.59)	(8.42)	(7.20)	(16.36)
lncapiten	0.333***	0.210***	0.507***	0.352***	0.331***	0.296***
t-stat	(38.81)	(14.92)	(44.25)	(30.73)	(28.28)	(13.43)
Year (tech change)	0.0227***	0.0237***	0.0297***	0.0367***	0.0288***	0.0151***
t-stat	(16.51)	(11.40)	(14.89)	(24.43)	(15.65)	(5.77)
_cons	-36.86***	-38.08***	-52.38***	-64.86***	-49.12***	-22.09***
t-stat	(-13.40)	(-9.14)	(-13.12)	(-21.65)	(-13.32)	(-4.27)
Usigma						
internetuse	-0.00178***	-0.000374**	0.000280*	-0.000509**	-0.00203**	-0.000116**
t-stat	(-3.43)	(-3.02)	(2.32)	(-3.01)	(-2.74)	(-3.23)
_cons	-1.688***	-0.943***	-0.736***	-1.884***	-1.899***	-0.914***
t-stat	(-11.19)	(-10.49)	(-9.46)	(-10.06)	(-9.60)	(-9.71)
Vsigma						
accountants	0.00000150	0.0000451*	.0001062	-0.0000326**	0.000106***	0.00000415
t-stat	(0.21)	(2.05)	(3.350)	(-2.63)	(3.35)	(0.71)
Year (tech change)	-0.0422***	0.0427	-0.158***	-0.0408***	-0.119***	-0.0555
t-stat	(-5.16)	(1.51)	(-8.45)	(-3.31)	(-11.25)	(-1.38)
_cons	82.96***	-88.63	314.8***	79.91**	237.6***	108.5
t-stat	(5.05)	(-1.57)	(8.40)	(3.23)	(11.19)	(1.35)
Theta						
_cons	0.868***	0.671***	0.702***	0.842***	0.865***	0.904***
t-stat	(32.58)	(10.40)	(19.43)	(33.34)	(33.40)	(18.51)
N	5427	1821	2938	2626	2970	1303
t-stat* p<0.05	** p<0.01	*** p<0.001"				

- ✓ Time (year) is important across the groups whereas the use of accountants is significant in three of the seven groups, namely in the paper and publishing industry (group 3), the food group (group 5) and wood furniture (group 6).
- ✓ Technical efficiency is rather modest at best in Kuwait's ISIC 2, industrial groups.
- ✓ Technical efficiency improved modestly during the period 2003-2019 and 2021
- ✓ Firm heterogeneity matters with larger firms tend to be more efficient;
- ✓ Technical progress embedded in time prompted improvements in technical efficiency
- ✓ Controlling for homoscedasticity is statistically warranted for the robust estimation of technical efficiency over time in virtually all commodity groups 2-23.

Table 5. Panel Stochastic Frontier Model Estimates (TRE Model) ISIC Groups 8 to 14

ISIC2 Groups	8	9	11	12	13	14
Name of ISIC2 Groups	Transport eq	Machinery	Construction	Trade	Recreation/Hot	Transport serv
Frontier	Frontier	Frontier	Frontier	Frontier	Frontier	Frontier
Inemployees	0.927***	0.655***	0.587***	0.342***	0.0592***	0.321***
t-stat	(39.63)	(21.48)	(81.53)	(81.22)	(3.85)	(23.53)
Incapiten	-0.0578*	0.229***	0.266***	0.368***	0.505***	0.367***
t-stat	(-2.50)	(8.42)	(48.41)	(120.15)	(63.66)	(33.15)
year (tech change)	0.00805	0.0336***	0.0197***	0.0303***	0.0180***	0.0152***
t-stat	(1.85)	(8.79)	(21.16)	(75.62)	(11.76)	(8.55)
_cons	-5.730	-58.78***	-31.33***	-53.14***	-28.53***	-22.75***
t-stat	(-0.65)	(-7.73)	(-16.88)	(-65.98)	(-9.28)	(-6.41)
Usigma						
internetuse	-0.000707*	-0.00000938	-0.00137***	-0.000223***	-0.0000767**	-0.00204***
t-stat	(-2.06)	(-0.36)	(-3.37)	(-9.70)	(-2.81)	(-3.43)
_cons	-1.704***	-1.560***	-2.780***	-1.622***	-1.262***	-3.111***
t-stat	(-9.08)	(-5.12)	(-11.78)	(-58.31)	(-9.81)	(-12.19)
Vsigma						
accountants	-0.00000667	0.0000253	0.0000148*	0.00000424*	0.00000340	-5.21e-08
t-stat	(-0.25)	(1.10)	(2.44)	(2.46)	(1.57)	(-0.09)
Year (tech change)	-0.201***	-0.0496	-0.0383***	-0.178***	-0.131***	-0.0580***
t-stat	(-4.12)	(-1.39)	(-9.68)	(-40.92)	(-12.62)	(-6.92)
_cons	400.0***	97.40	75.30***	355.7***	262.3***	115.4***
t-stat	(4.10)	(1.36)	(9.46)	(40.71)	(12.56)	(6.84)
Theta						
_cons	0.349***	0.827***	0.619***	0.809***	0.810***	1.071***
t-stat	(12.67)	(13.48)	(44.95)	(84.78)	(35.96)	(36.54)
N	298	612	11798	38387	5156	4446
t-stat * p<0.05	** p<0.01	*** p<0.001"				

Table 6. Panel Stochastic Frontier Model Estimates (TRE Model) ISIC Groups 15 to 23

ISIC2 Groups	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
Name of ISIC2 Groups	Leasing	Tel/IT	Ed\Res	Finance	Real Estate	Adv/consulting	Recreation	Non fin srv.	Health
Frontier									
Inemployees	0.366***	0.594***	0.740***	0.618***	0.142***	0.361***	0.550***	0.182***	0.538***
t-stat	(14.80)	(22.53)	(48.16)	(31.04)	(7.64)	(32.35)	(26.20)	(14.83)	(27.37)
Incapiten	0.420***	0.235***	0.108***	0.308***	0.331***	0.340***	0.320***	0.555***	0.282***
t-stat	(32.56)	(9.91)	(13.75)	(22.57)	(28.03)	(41.42)	(21.84)	(53.70)	(18.08)
year	0.00800***	0.0184***	0.0359***	-0.0335***	0.00842**	0.0139***	0.00655**	0.0234***	0.0172***
t-stat	(3.69)	(7.52)	(24.58)	(-16.84)	(3.06)	(9.86)	(3.22)	(15.75)	(7.12)
_cons	-9.124*	-27.88***	-63.11***	75.74***	-7.822	-19.58***	-5.501	-40.71***	-26.30***
t-stat	(-2.10)	(-5.68)	(-21.50)	(18.93)	(-1.42)	(-6.92)	(-1.35)	(-13.66)	(-5.42)
Usigma									
internetuse	0.0000371	-0.000156**	-0.000239***	-0.0000401***	-0.000198***	-0.000807***	0.0000170**	-0.0000243	-0.000414***
t-stat	(0.88)	(-2.86)	(-5.46)	(-9.76)	(-3.35)	(-9.25)	(3.12)	(-0.61)	(-6.84)
_cons	-1.557***	-1.734***	-1.621***	0.556***	-0.826***	-1.145***	-1.193***	-1.325***	-0.739***
t-stat	(-15.61)	(-7.20)	(-19.91)	(12.36)	(-5.96)	(-16.50)	(-15.47)	(-12.97)	(-8.13)
Vsigma									
accounten	-0.0000246	-0.00000716**	-0.0000145	-0.000000922	0.00000213*	0.00000886*	0.0000180	-0.0000858	-0.0000123
t-stat	(-0.95)	(-3.14)	(-1.66)	(-1.42)	(2.48)	(2.00)	(0.89)	(-1.80)	(-0.54)
year	-0.211***	-0.122***	-0.214***	-0.175***	-0.198***	-0.120***	-0.287***	-0.126***	-0.111***
t-stat	(-8.51)	(-6.49)	(-10.73)	(-7.68)	(-11.58)	(-12.14)	(-5.44)	(-6.82)	(-3.97)
_cons	421.7***	242.9***	426.6***	349.6***	397.0***	239.1***	572.2***	251.5***	220.7***
t-stat	(8.46)	(6.45)	(10.68)	(7.65)	(11.57)	(12.04)	(5.41)	(6.76)	(3.92)
Theta									
_cons	0.714***	1.387***	0.682***	0.833***	0.988***	0.753***	0.838***	0.787***	0.592***
t-stat	(25.36)	(28.64)	(31.68)	(25.96)	(23.69)	(36.79)	(27.91)	(34.42)	(26.22)
N	1203	1008	2105	3810	2527	5683	941	2065	856
t statistics in parentheses									
t-stat* p<0.05	** p<0.01	*** p<0.001"							

Findings from ISIC level 2 Groups

- ✓ Firm heterogeneity seems significant in the case of some ISIC Groups with larger firms achieving higher technical efficiency than SMEs in general as shown in tables 24 and 25.
- ✓ For instance, in the case of metallic and non-metallic manufacturing, technical efficiency is 72% for micro and small firms, 79% for medium size firms and 91% large firms.
- ✓ The case of machine manufacturing the efficiency of micro firm is 71% and seem to decline to 69% in the case of larger firms.
- ✓ The case of chemical and rubber firms is bimodal with efficiency at 55% in the case of micro firms and 62-63% for small and medium firms dipping to 58% in the case of larger firms.

Table 7. Variability of Technical Efficiency According to Firm-Size for Groups 2 to 11

Size	Metal/ Nonmetallic	Paper/Pub	Apparel/ Textile	Food Manu	Wood\ Furniture	Chem/ Rubber	Transport Equip	Machine Manufact	Construt
Micro	.721	.647	.594	.759	.754	.55	.643	.711	.839
Small	.716	.574	.456	.696	.733	.631	.664	.676	.825
Medium	.79	.666	.532	.773	.778	.624	.647	.708	.854
Large	.914	.74	.	.733	.967	.579	.769	.687	.906

Table 8. Variability of Technical Efficiency According to Firm-Size for Groups 12 to 23

	Trade	Rest/Hot	Transport	Lease	Tele/IT	Educ/Res	Finance	Real Est	Other Gr	Recreate	Health
Micro	.71	.693	.896	.711	.72	.648	.483	.63	.729	.631	.628
Small	.642	.635	.864	.581	.752	.605	.427	.603	.625	.56	.812
Medium	.682	.659	.881	.734	.76	.721	.489	.74	.701	.489	.718
Large	.735	.672	.955	.408	.918	.704	.683	.813	.815	.617	.839

Table 9. Technical Efficiency Estimates for ISIC Groups 2 to 11

Year	Met/Nonm	Pap/Pub	App/Tex	Food	Wood/Fr	Chem/Rub	Transp.	Machine	Const.
2003	.709	.547	.562	.73	.73	.583	.685	.69	.825
2004	.712	.587	.566	.731	.733	.6	.673	.681	.824
2005	.722	.609	.577	.739	.743	.617	.723	.708	.824
2006	.729	.608	.591	.745	.738	.619	.713	.74	.829
2007	.735	.601	.597	.735	.746	.672	.72	.727	.829
2008	.735	.607	.581	.75	.743	.689	.746	.702	.831
2009	.741	.595	.576	.741	.746	.611	.698	.682	.83
2010	.738	.607	.574	.738	.747	.611	.724	.687	.832
2011	.754	.643	.608	.756	.752	.618	.723	.703	.836
2012	.743	.626	.628	.745	.743	.618	.736	.707	.84
2013	.762	.664	.643	.765	.753	.634	.745	.756	.843
2014	.762	.663	.629	.759	.761	.656	.729	.726	.843
2015	.763	.645	.635	.762	.755	.657	.727	.719	.849
2016	.763	.614	.61	.765	.759	.61	.758	.716	.848
2017	.755	.595	.584	.759	.749	.604	.726	.689	.846
2018	.752	.576	.584	.746	.759	.632	.692	.705	.85
2019	.746	.553	.576	.749	.755	.612	.663	.701	.847

Table 10. Technical Efficiency for ISIC Groups 12 to 23

Year	Trade	Rest	Trans	Lease	TelIT	Edres	Fin	Reaest	Othbz	Recr	Acoth	Health
2003	.681	.665	.861	.662	.719	.661	.371	.58	.648	.562	.66	.59
2004	.682	.668	.857	.675	.731	.676	.374	.583	.655	.579	.685	.604
2005	.683	.655	.86	.666	.732	.679	.43	.599	.66	.578	.658	.607
2006	.685	.657	.864	.664	.742	.645	.44	.598	.676	.565	.649	.601
2007	.694	.645	.865	.672	.755	.667	.499	.608	.675	.559	.636	.633
2008	.688	.661	.866	.635	.763	.648	.479	.604	.68	.563	.65	.628
2009	.68	.652	.865	.661	.762	.654	.428	.591	.675	.574	.64	.632
2010	.683	.659	.867	.656	.764	.654	.4	.602	.682	.554	.627	.633
2011	.692	.674	.871	.676	.755	.71	.411	.599	.695	.607	.647	.68
2012	.693	.664	.88	.674	.763	.708	.407	.62	.721	.642	.681	.696
2013	.711	.682	.883	.691	.782	.73	.452	.644	.735	.706	.699	.697
2014	.713	.684	.885	.692	.758	.741	.476	.62	.749	.657	.678	.674
2015	.717	.678	.888	.67	.767	.756	.511	.63	.736	.617	.68	.669
2016	.71	.688	.888	.671	.763	.737	.465	.635	.734	.616	.693	.65
2017	.706	.684	.889	.666	.757	.718	.48	.636	.718	.57	.673	.664
2018	.719	.683	.886	.691	.763	.701	.484	.634	.731	.589	.666	.676
2019	.701	.672	.889	.684	.768	.686	.49	.648	.718	.611	.652	.693

Table 11. Firms Technical Efficiency According to Economic\Industrial Groups

Firms According to Economic Activity	2003	2019
Food Products	0.725	0.746
Restaurant Businesses	0.671	0.674
Textiles Apparel	0.562	0.576
Precision and Machinery Manufacturing	0.690	0.701
Healthcare Providers	0.590	0.693
Education-Research	0.661	0.686
Computer & Telecommunications	0.719	0.768
Chemical & Rubber Products Manufacturing Firms	0.583	0.612
Transport	0.685	0.663

Insights derived from the analysis (table 11 above):

1. There is a substantive loss of technical efficiency in Kuwait's firms across the board; Culprit: Workforce is low-skilled management & incentive system
2. Technical efficiency estimates remain unchanged over the 2003-2019 period;
3. Some industrial groups have higher average technical efficiency than others. For example, firms engaged in computing and telecommunications; Firms in food products also had an overall technical efficiency of 72% in 2003 which increased to 75% in 2019.
4. Laggards: Firms engaged in the chemical and rubber products had an overall technical efficiency of 58% in 2003 and inched up minutely to 61% in 2019.
5. Technical efficiency of firms in the restaurant's businesses remained at 67%.

Table 12. Technical Efficiency for 2022 KISR Survey of Manufacturing Sector Companies

		(1)
		Frontier
	Intotemp	0.344***
		-6.187
	lncapit	0.493***
		-9.941
	year	0.098***
		-2.837
	_cons	-192.872***
		(-2.771)
Usigma:		
	lnrand	0.571
		-1.097
	_cons	-8.558
		(-1.543)
Vsigma:		
	lnnkskill	0.027
		-0.754
	year	-0.00201***
		(-3.542)
Theta:		
	_cons	1.493***
		-24.02
	N	943
Log simulated-likelihood = -1566.3492		
Wald chi2(3) = 219.38		

1. Table 12: The survey contained purposefully selected companies (higher end with more educated workers and high-tech companies such as petrochemicals refined and energy related companies and other tech companies) relative to CSB Survey.
2. The idiosyncratic error variance component indicate that tech progress reduces inefficiency. R&D as the proposed exp variable for ineff. has the right sign but is not robust.
3. Technical progress is captured by the variable “year”. In the frontier model, it implies that tech progress positively impacted output at 9.8%. In the inefficiency component, its coefficient came out with a robustly negative sign so that inefficiency was decreasing.

Table 13. Technical Efficiency for 2022 KISR's Survey of Manufacturing Sector Companies by year

year	Mean	p50	SD	Min	Max
2019	0.92268	0.93688	0.06392	0.75956	0.98757
2020	0.92471	0.937	0.06653	0.55474	0.98752
2021	0.92939	0.93681	0.0623	0.64786	0.98753
Overall	0.92572	0.93688	0.06421	0.55474	0.98757

Notice that the above table (13) in each year there were minority companies whose efficiency level was as low as 55% in 2020, 64.8% in 2021 and 75.6% in 2019. Finally, KISR's 2022 data pertains to companies at the sector level whereas the Est. Survey data are at the ISIC-2 level.

Table 14. Technical Efficiency for Manufacturing sector in CSB Establishment Survey 2003-2019

Inprodn	Coefficient	Std.	err.	z	P>z	[95% conf. interval]
Frontier						
lnemployees	0.2992754	0.008251	36.27	0	0.283105	0.3154462
lncapiten	0.371649	0.004697	79.13	0	0.362443	0.3808548
year	0.027336	0.000746	36.63	0	0.025873	0.0287986
_cons	-46.53704	1.493215	-31.17	0	-49.4637	-43.61039
Usigma						
internetuse	-0.0003623	4.41E-05	-8.22	0	-0.00045	-0.0002759
_cons	-1.181346	0.044313	-26.66	0	-1.2682	-1.094495
Vsigma						
accounten	0.0000563	3.21E-06	17.55	0	0.00005	0.0000625
year	-0.0744137	0.005791	-12.85	0	-0.08576	-0.063063
_cons	147.5381	11.63586	12.68	0	124.7323	170.344
Theta						
_cons	1.000786	0.015737	63.6	0	0.969943	1.031628
E(sigma_u)	0.5308449	0.52982	0.53187			
E(sigma_v)	0.4809519	0.302955	0.658949			

Table 15. Summary of Technical efficiency via $\exp(-E(u|e))$

year	Mean	Std. dev.	Freq.
2003	0.6347894	0.12877948	1,035
2004	0.64174122	0.13002635	1,038
2005	0.65634957	0.12716296	1,052
2006	0.6626928	0.12922064	1,063
2007	0.66875391	0.12907971	1,100
2008	0.66636244	0.12971321	1,104
2009	0.66203392	0.12753527	1,085
2010	0.66460135	0.12507281	1,087
2011	0.68251727	0.11727516	1,094
2012	0.676937	0.11998587	1,090
2013	0.69459455	0.1144193	1,017
2014	0.69171907	0.1213752	1,023
2015	0.69072646	0.12801928	1,019
2016	0.68350371	0.13084875	1,084
2017	0.67120829	0.14166527	1,090
2018	0.66999835	0.15609876	1,086
2019	0.66436308	0.15739832	1,089
Total	0.66953844	0.13170308	18,156

Thank you