KIVILCIM METIN-ÖZCAN, EBRU VOYVODA, AND
ERINÇ YELDAN

The Impact of the Liberalization Program on the Price–Cost Margin and Investment of Turkey's Manufacturing Sector After 1980

Abstract: *In this paper, we investigate the structural consequences of the post-1980 outward-orientation on the market concentration and accumulation patterns in the Turkish manufacturing industries. Using various panel data procedures over twenty-nine subsectors of Turkish manufacturing for the 1980–1996 period, we focus on three sets of issues: (1) the effect of openness on the extent of market concentration as measured in CR4 ratios; (2) the behavior of gross profit margins (markups) in relation to openness, concentration ratios, and real wage costs; and (3) the behavior of sectoral real investments (by destination) in relation to the profit margins, real wage costs, and the openness indicator.*

Our results suggest very little structural change in the sectoral composition and nature of market concentration and behavior of profit margins under the post-1980 structural adjustment reforms and outward-orientation. We find that, contrary to expectations, "openness" had very little impact, if any, on profit margins (markups), and, within manufacturing, the trade-adjusting sectors reveal a positive relationship between the profit margins and openness. Profit margins are found to be positively and significantly related to concen-

tration power and real wage cost increases. Real investments in the sector display a positive relationship with profit margins and real wages yet bear a statistically insignificant relationship vis-à-vis openness.

Key words: *market concentration, markup, openness, Turkish manufacturing.*

In this paper, we investigate the structural consequences of the post-1980 outward-orientation on the market concentration and accumulation patterns in the Turkish manufacturing industries. The period under analysis is known to span the overall transformation of the Turkish economy from domestic demand-oriented import-substitutionist industrialization to one with export-orientation and integration with the global commodity and financial markets. During this period, the manufacturing industry has evolved as the main sector in both leading the export-orientation of the economy and as a focal sector wherein the distribution patterns between wage-labor and capital have been reshaped.

Existing independent studies[1] and rudimentary data from official agencies suggest both formal and anecdotal evidence that one of the major structural deficiencies of the sector reveals itself in the rather loose association between the gains in export penetration and labor productivity, on one hand, and the dismal patterns of employment, accumulation, and of remunerations of wage labor, on the other. This deformation is, in fact, observed to be a perennial feature of the post-1980 structural adjustment era. In their analysis of the decomposition of labor productivity in manufacturing, for instance, Voyvoda and Yeldan (1999) report that, since the inception of the structural adjustment reforms and outward-orientation, the underlying sources of productivity gains were not significantly altered in the sector. They found that none of the leading export sectors of the 1980s could have generated sufficiently strong productivity contributions, nor admitted strong inter-industry linkages to serve as the leading sectors propelling the rest of the economy.

Given this background, there exists further considerable evidence on the extent of monopolization and high concentration in the Turkish manufacturing industries. The State Institute of Statistics (SIS) data suggest, for instance, that the process of export orientation and overall trade liberalization since 1980 has not affected the structural characteristics of the manufacturing industry. Many of the monopolistically competitive sectors either kept their existing high rates of concentration, or even suffered from increased monopolization as measured by their CR4 ratios or Herfindahl indices. Even among many competitive sectors of 1980, one observes increases in the CR4 ratios by 1996.[2]

These observations suggest that, contrary to expectations, the opening process was unable to introduce warranted increases in competition in the industrial commodity markets. In this paper, we attempt to formalize on these observations and deduce econometric hypotheses on the patterns of trade liberalization, concentration, and profitability. To this end, we estimate our empirical questions using various

panel data procedures. We focus on three sets of issues: (1) effect of openness on the extent of market concentration as measured in CR4 rates; (2) the behavior of gross profit margins (markups) in relation to openness, concentration rates, and real wage costs; and (3) the behavior of sectoral real investments (by destination) in relation to the markups, real wage costs, and the openness indicator.

Tackling on a similar set of issues as ours, Yalçén (2000) performed a two-stage least square estimation of price–cost margins (markups) using panel data of the ISIC four-digit level of Turkish manufacturing industries over the 1983–1994 period. Yalçén's analysis is directly focused on the "import-discipline hypothesis"— whether the import penetration, due to foreign trade liberalization of the 1980s, was sufficient to remove the excess profits of the oligopolistic domestic firms, enhancing a relatively competitive market behavior. Utilizing panel data analyses for the public versus private sectors separately, Yalçén (2000) found that even though there had been an overall decrease in the profit margins in the entire private sector, profit margins in the highly concentrated subsectors of private manufacturing did in fact increase along with import penetration. In contrast, using private manufacturing data over the 1977–1985 period, Forouton (1991) reported that import penetration in the concentrated sectors led to a reduction in the gross profit margins. Similarly, Engin et al. (1995) note that, despite the nominal expectations of competitive pressures on the markups via the discipline of import penetration, they found no statistically significant relationship between import penetration and profit margins in the private sector.

As such, the existing literature on the Turkish manufacturing industry fails to provide an unambiguous indication of increased competitiveness and falling profit margins, despite expectations of pressures of global commodity markets. Thus, an exclusive purpose of this paper is to provide a formal assessment of these issues.

Phases of Macroeconomic Adjustment in Turkish Manufacturing

Table 1 summarizes the main indicators of the manufacturing industry under the post-1980 adjustments. To document the extent of the oligopolistic structure of the sector, we tabulate the rate of market concentration in the manufacturing industry subsectors as calculated by the shares of the *four* largest enterprises in the total sales (revenues) of the sector (hence, the acronym CR4). Accordingly, we classify those sectors with CR4 ratios above 30 percent to be *imperfectly competitive,* and those having CR4 ratios below this threshold as *competitive.*[3] Data on other sectoral variables comes from the SIS *Manufacturing Industry Annual Surveys.* To arrive at "wage rates" and the "average labor product," we have used data on "total wages paid" and "value added" divided, respectively, by "average number of workers engaged." We have used the sectoral wholesale producer prices in deflating nominal magnitudes.

The periodization of Table 1 follows the adjustment path of the overall economy. Over the last two decades, the Turkish economy has been observed going through

Table 1

Phases of Macroeconomic Adjustment in Turkish Manufacturing, 1980–1997

				1980			
Sectors	Concentration ratios (CR4)	Foreign trade ratio to value added	Share of public sector in value added	Share of labor costs in value added	Growth in real wages (%)	Growth in real average product of labor (%)	Gross profit margins (markup)
Competitive sectors (as of 1980)							
311	10.2	0.38	0.33	0.33	5.50	41.57	0.21
312	22.1	0.57	0.50	0.43	1.91	40.92	0.17
321	12.7	0.29	0.14	0.34	17.99	13.11	0.31
322	21.3	2.18	0.02	0.36	−10.84	44.56	0.21
323	21.6	0.03	0.00	0.46	3.28	60.87	0.14
331	19.9	0.08	0.37	0.37	3.63	−7.40	0.29
352	21.2	0.29	0.05	0.28	0.49	43.18	0.27
356	25.4	0.02	0.01	0.27	8.71	−4.39	0.28
369	17.0	0.19	0.20	0.28	−2.61	47.85	0.44
381	16.3	0.72	0.07	0.30	13.85	8.34	0.40
383	15.0	0.60	0.29	0.32	−8.37	13.63	0.36
Average	—	0.39	0.15	0.33	2.77	26.54	0.28

(continues)

Table 1 (continued)

			1980				
Sectors	Concentration ratios (CR4)	Foreign trade ratio to value added	Share of public sector in value added	Share of labor costs in value added	Growth in real wages (%)	Growth in real average product of labor (%)	Gross profit margins (markup)
Imperfectly competitive and oligopolistic sectors (as of 1980)							
313	55.8	0.02	0.65	0.18	1.77	37.51	1.17
314	46.4	0.00	0.92	0.50	19.24	58.96	0.28
324	63.1	0.01	0.53	0.47	26.92	19.53	0.19
332	37.5	0.13	0.00	0.31	24.65	109.13	0.31
341	47.4	0.34	0.47	0.52	−15.06	−0.57	0.19
342	36.5	0.05	0.19	0.52	−0.68	89.56	0.19
351	49.2	1.78	0.54	0.21	−2.24	−10.13	0.47
353	100.0	0.71	1.00	0.04	−12.79	180.20	0.37
354	54.7	0.03	0.08	0.11	2.91	−4.65	0.53
355	71.5	0.14	0.00	0.26	−0.84	8.92	0.40
361	79.6	0.03	0.17	0.36	1.94	−7.68	0.72
362	72.1	0.26	0.00	0.31	40.16	34.15	0.68
371	54.8	0.47	0.67	0.46	6.48	18.68	0.22
372	47.2	0.35	0.51	0.37	2.18	−17.95	0.30
382	33.4	1.37	0.22	0.42	9.69	25.45	0.25
384	35.8	0.70	0.32	0.51	−16.89	22.31	0.21
385	32.2	11.05	0.00	0.28	80.61	29.13	0.42
390	42.3	0.54	0.00	0.31	−7.41	−0.76	0.45
Average	—	0.67	0.62	0.28	3.39	83.25	0.34

| | | Export-led growth 1981–1988 | | | | | |
Sectors	Concentration ratios (CR4)	Foreign trade ratio to value added	Share of public sector in value added	Share of labor costs in value added	Growth in real wages (%)	Growth in real average product of labor (%)	Gross profit margins (markup)
Competitive sectors (as of 1980)							
311	11.6	0.92	0.29	0.23	−3.721	6.74	0.21
312	23.3	0.47	0.43	0.23	−4.469	10.85	0.17
321	9.2	0.81	0.12	0.26	−0.804	7.62	0.32
322	19.2	4.63	0.01	0.20	−0.616	11.10	0.27
323	18.3	0.70	0.00	0.22	−3.921	8.63	0.22
331	17.1	0.97	0.39	0.24	−4.366	6.66	0.24
352	22.6	0.52	0.04	0.18	0.75	11.48	0.38
356	21.0	0.25	0.00	0.21	−1.55	6.92	0.24
369	18.5	0.43	0.22	0.19	−0.47	5.67	0.49
381	14.9	2.66	0.08	0.23	−0.80	7.91	0.37
383	24.9	1.23	0.07	0.19	−1.91	8.88	0.42
Average	—	1.04	0.13	0.22	−1.88	8.83	0.33

Table 1 (continued)

Sectors	Concentration ratios (CR4)	Export-led growth 1981–1988					
		Foreign trade ratio to value added	Share of public sector in value added	Share of labor costs in value added	Growth in real wages (%)	Growth in real average product of labor (%)	Gross profit margins (markup)
Imperfectly competitive and oligopolistic sectors (as of 1980)							
313	45.4	0.04	0.61	0.10	−5.27	9.02	1.35
314	64.9	0.08	0.91	0.11	−7.42	22.61	1.26
324	49.3	0.32	0.40	0.43	−5.65	45.41	0.18
332	47.4	0.64	0.19	0.20	3.49	16.00	0.43
341	37.0	0.64	0.47	0.23	−7.52	9.83	0.28
342	38.4	0.14	0.09	0.25	−1.13	13.94	0.41
351	41.0	2.84	0.40	0.12	−3.87	12.62	0.35
353	99.2	0.29	0.86	0.01	−6.30	16.16	0.66
354	68.9	0.18	0.11	0.06	−3.17	3.03	0.31
355	70.7	0.42	0.00	0.19	−2.15	7.06	0.38
361	62.0	0.14	0.14	0.16	−3.10	12.23	0.83
362	61.0	0.56	0.00	0.21	2.65	13.84	0.61
371	43.5	1.50	0.52	0.22	−4.90	12.49	0.23
372	49.0	1.19	0.35	0.23	−4.52	8.97	0.24
382	38.0	3.03	0.19	0.27	−2.65	9.44	0.29
384	35.7	1.17	0.12	0.26	−4.35	10.25	0.32
385	34.7	18.45	0.16	0.30	8.87	12.50	0.37
390	37.9	1.22	0.00	0.26	−1.53	2.57	0.40
Average	—	1.04	0.53	0.14	−3.15	12.71	0.46

Sectors	Concentration ratios (CR4)	Foreign trade ratio to value added	Share of public sector in value added	Share of labor costs in value added	Growth in real wages (%)	Growth in real average product of labor (%)	Gross profit margins (markup)
			Unregulated financial liberalization 1989–1993				
Competitive sectors (as of 1980)							
311	13.0	0.62	0.31	0.23	16.02	15.78	0.29
312	18.7	0.51	0.32	0.37	20.31	5.35	0.16
321	8.5	0.94	0.07	0.28	7.37	7.10	0.35
322	5.6	2.40	0.02	0.20	3.83	7.07	0.30
323	27.0	2.24	0.00	0.22	2.38	7.30	0.28
331	20.5	0.38	0.28	0.32	16.20	10.95	0.24
352	22.7	0.52	0.03	0.18	12.68	15.74	0.55
356	20.4	0.30	0.02	0.21	8.10	10.86	0.33
369	19.5	0.30	0.15	0.20	11.49	13.93	0.65
381	18.8	0.80	0.05	0.24	8.37	8.54	0.44
383	29.7	1.25	0.01	0.23	13.29	12.64	0.46
Average	—	0.90	0.10	0.23	11.62	11.69	0.39

(continues)

Table 1 (continued)

Sectors	Concentration ratios (CR4)	Foreign trade ratio to value added	Share of public sector in value added	Share of labor costs in value added	Growth in real wages (%)	Growth in real average product of labor (%)	Gross profit margins (markup)
			Unregulated financial liberalization 1989–1993				
Imperfectly competitive and oligopolistic sectors (as of 1980)							
313	33.0	0.40	0.51	0.12	18.43	10.50	1.08
314	59.6	0.22	0.84	0.20	25.05	2.31	0.75
324	37.1	0.52	0.29	0.39	6.14	11.44	0.25
332	44.9	0.38	0.00	0.22	9.92	6.48	0.43
341	25.6	0.81	0.32	0.35	17.69	5.90	0.31
342	50.1	0.12	0.09	0.17	6.67	22.19	0.52
351	49.9	2.31	0.38	0.25	15.67	−5.96	0.39
353	98.1	0.17	1.00	0.02	24.42	9.21	1.12
354	74.6	0.21	0.08	0.16	14.17	4.64	0.20
355	71.5	0.55	0.01	0.25	15.83	9.99	0.58
361	58.8	0.13	0.07	0.19	15.73	13.18	1.06
362	51.9	0.49	0.02	0.29	15.81	11.56	0.60
371	35.7	1.55	0.39	0.38	18.26	5.59	0.19
372	46.8	1.08	0.30	0.35	17.66	3.08	0.28
382	44.8	2.49	0.09	0.26	11.37	11.39	0.39
384	47.8	0.89	0.07	0.26	14.56	16.16	0.34
385	45.1	6.25	0.11	0.24	8.60	18.60	0.51
390	29.3	1.83	0.06	0.27	5.74	9.16	0.48
Average	—	0.89	0.43	0.20	15.40	8.53	0.49

Sectors	Concentration ratios (CR4)	Foreign trade ratio to value added	Share of public sector in value added	Share of labor costs in value added	Growth in real wages (%)	Growth in real average product of labor (%)	Gross profit margins (markup)
Financial crisis and reinvigoration of foreign capital-led growth 1994–1996							
Competitive sectors (as of 1980)							
311	14.4	1.20	0.13	0.19	−9.57	−6.22	0.31
312	18.2	1.18	0.13	0.23	−9.55	6.70	0.20
321	7.5	1.76	0.03	0.22	−9.52	−2.42	0.36
322	6.0	1.86	0.02	0.20	−1.58	−1.60	0.31
323	24.1	2.72	0.05	0.20	−2.50	4.36	0.26
331	30.6	0.80	0.11	0.22	−14.41	−3.49	0.28
352	20.4	0.90	0.02	0.15	−6.53	−1.87	0.66
356	20.0	0.93	0.04	0.16	−3.46	−0.43	0.38
369	19.5	0.39	0.04	0.15	−9.92	−3.33	0.72
381	16.7	1.22	0.05	0.19	−6.28	−0.27	0.43
383	24.4	1.95	0.02	0.20	−8.93	−6.08	0.52
Average	—	1.46	0.04	0.19	−7.92	−2.00	0.38

(continues)

Table 1 (continued)

	Financial crisis and reinvigoration of foreign capital-led growth 1994–1996						
Sectors	Concentration ratios (CR4)	Foreign trade ratio to value added	Share of public sector in value added	Share of labor costs in value added	Growth in real wages (%)	Growth in real average product of labor (%)	Gross profit margins (markup)
Imperfectly competitive and oligopolistic sectors (as of 1980)							
313	34.6	0.11	0.35	0.10	−10.27	−6.43	0.76
314	64.5	0.90	0.45	0.23	−9.32	−14.05	0.44
324	36.5	1.72	0.18	0.27	−9.41	1.19	0.35
332	40.6	0.72	0.00	0.17	−11.16	−0.88	0.52
341	22.6	1.46	0.19	0.24	−9.04	−3.09	0.40
342	60.0	0.19	0.07	0.14	−3.08	−2.19	0.44
351	57.4	3.02	0.48	0.16	−6.66	7.14	0.55
353	98.3	0.24	1.00	0.01	−9.65	6.32	1.09
354	63.4	0.16	0.04	0.13	−15.73	2.75	0.43

355	74.8	0.85	0.01	0.20	−7.40	2.18	0.63
361	59.4	0.29	0.05	0.17	−9.02	−7.27	1.04
362	56.9	0.71	0.00	0.25	−4.66	−4.49	0.69
371	31.5	1.75	0.38	0.19	−10.74	9.79	0.32
372	45.4	2.46	0.38	0.23	−10.31	1.42	0.30
382	42.2	4.10	0.07	0.20	−6.97	0.92	0.45
384	41.0	1.91	0.05	0.20	−8.29	−0.69	0.38
385	56.8	5.58	0.05	0.16	−10.11	1.11	0.59
390	29.2	3.71	0.06	0.18	−6.55	6.87	0.57
Average	—	1.59	0.42	0.14	−8.28	3.24	0.53

Note: The data cover twenty-nine subsectors of Turkish manufacturing for the period 1980–1996.

three distinct cycles of growth crisis and adjustment: The first broadly covers the 1980–1989 period, with its main attribute being the increased export-orientation of the economy. Following the foreign exchange crisis of 1977–1980, growth was reinvigorated following the introduction of a structural adjustment program in January 1980, under the auspices of international centers such as the World Bank and the International Monetary Fund (IMF). The 1981–1987 period was marked with commodity trade liberalization and export promotion, along with a price reform aimed at reducing the state's role in economic affairs. The existing system of fixed exchange rate administration was replaced by a flexible regime of crawling-peg, and, together with the introduction of a complex system of direct export subsidization, acted as the main instruments for the promotion of exports and pursuit of macroeconomic stability.[4]

During the 1983–1987 period, export revenues increased at an annual rate of 10.8 percent, and the gross domestic product (GDP) rose at an annual rate of 6.5 percent. The period was also characterized by a severe erosion of wage incomes via hostile measures against organized labor. The suppression of wages was instrumental both in lowering production costs and in squeezing the domestic absorption capacity. The share of wage-labor in manufacturing value added receded from its average of 35.6 percent in 1977–1980 to 20.6 percent in 1988. In this process, the average markup rate (profit margins) in private manufacturing increased from 31 percent to 38 percent.

During the 1980s, the composition of total fixed investments displayed quite adverse trends at the sectoral level from the point of view of strategic targets. In fact, as gross fixed investments of the private sector increased by 14.1 percent during the 1983–1987 period, only a small portion of this amount was directed to manufacturing. The rate of growth of private manufacturing investments has been on the order of one-half of this figure, at a rate of only 7.7 percent per annum, and could not reach its pre-1980 levels in real terms until the end of 1989. Much of the expansion in private manufacturing investments originated from the pull from housing investments, which expanded by an annual average of 24.5 percent during the 1983–1987 period. This resulted in a significant anomaly as far as the official stance toward industrialization was concerned: in a period where outward orientation was supposedly directed to increased manufacturing exports through significant price and subsidy incentives, distribution of investments revealed a declining trend for the sector. The implications of this nonconformity between the stated foreign trade objectives toward *manufacturing exports* and the realized patterns of accumulation *away from manufacturing* constituted one of the main structural deficiencies of the export-oriented growth strategy of the 1980s and, according to our view, played a crucial role in the failure of maintaining the export promotion program as a sustainable strategy of development.

As this unbalanced structure failed to generate the necessary accumulation patterns, the artificial growth path generated by way of wage suppression and price subsidies was observed to reach its economic and political limits by 1988. Starting

in 1988, we observe real wage earnings to enter a period of recovery following the gains of union movement, and also of the new wave of populist pressures. As can be observed from data in Table 1, all subsectors of manufacturing experienced significant rises in wage remunerations. On average, *real* wages in manufacturing increased at an annual rate of 10.2 percent from 1989 to 1993. In retrospect, it can be argued that the post-1988 populism could evidently be financed by expanding the tax base over the "unrecorded private commercial transactions," and by moving toward a "fair" tax system. Yet, the strategic preference of the government was the maintenance of its current stance toward erosion of taxable capital incomes and absorption of all costs of adjustment in favor of profit incomes against the culminating wage pressures (Boratav et al. 2000; Cizre-Sakallíoglu and Yeldan 2000; Türel 1999). As one of the major indicators of the (functional) distribution of income, we observe that the profit margins, in fact, followed a rising trend, and reached 47 percent in 1994, from its average of 33.5 percent in 1989. See Figure 1 for the portrayal of markups and real wage costs over the 1980–1996 time period.

Given these broad shifts in the macroeconomic environment, the 1989 policy maneuver of capital account liberalization served as one of the major policy initiatives to a new round of growth. This policy maneuver paved the way for injection of liquidity to the domestic economy in terms of short-term foreign capital (flows of "hot money"). Such inflows enabled, on one hand, financing of the accelerated public sector expenditures, and also provided relief of the increased pressures of aggregate demand on the domestic markets by way of cheapening costs of imports.[5] Consequently, the bonanza of cheap, imported intermediates fueled the second wave of the growth cycle between 1989 and 1993.

Erratic movements in the current account, a rising trade deficit (from 3.5 percent of gross national product [GNP] during the 1985–1988 period to 6 percent during the 1990–1993 period) and a drastic deterioration of fiscal balances disclose the unsustainable character of the post-1989 populism financed by foreign capital inflows. This prolonged instability reached its climax during the fourth quarter of 1993, when the currency appreciation and the consequent current account deficits rose to unprecedented levels. With the sudden drainage of short-term funds in the beginning of January 1994, imports dwindled by 15 percent, GDP fell by 5.5 percent, and the inflation rate soared to 106 percent. Together with this contraction, the post-1994 crisis management gave rise to significant shifts in income distribution, and real wages in manufacturing declined by 36.3 percent. Likewise, dollar-denominated wage costs decreased substantially and enabled export earnings to rise. In this manner, Turkey has once again switched back to its classic mode of surplus extraction, whereby export performance of industrial sectors depend on savings on wage costs. In fact, the disequilibrium could have only been accommodated by the massive (downward) flexibility displayed by real remunerations of wage-labor. Thus, the post-1995 period witnessed the reinvigoration of foreign capital-led growth—the third cycle. Finally, the global deceleration following the contagion of the Asian financial crisis hit the Turkish economy starting in August

Figure 1. **Profit Margins (Markup Rates) and Real Wage Costs in Turkish Private Manufacturing**
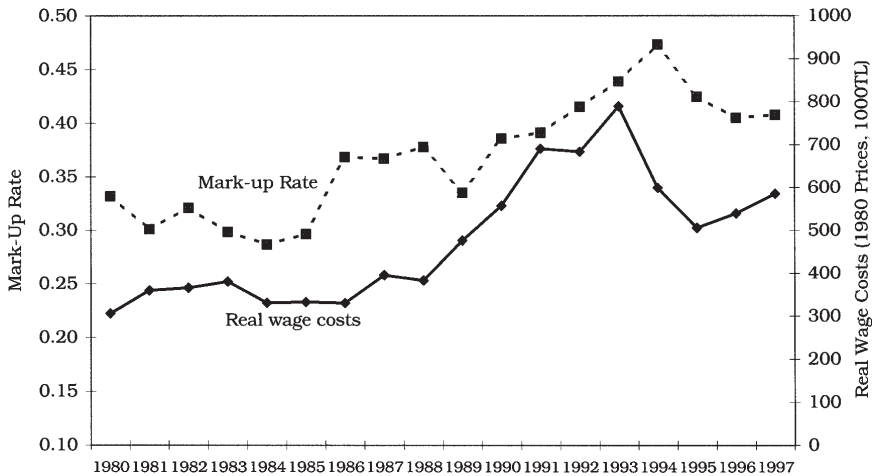
1998 under the already adverse conditions of severe macroeconomic disequilibria with accelerating fiscal and current account deficits, high inflation and unemployment, and increased social unrest.

Clearly, the inherent characteristics of the growth-crisis–adjustment cycles identified thus far have had quite different macroeconomic dynamics in operation. The export-orientation phase (1980–1988) was driven by commodity trade liberalization and real depreciation under conditions of wage suppression. The post-1989 financial liberalization completed the integration of the domestic economy with the global commodity and financial markets, and initiated a process of short-term foreign capital-led growth with abrupt mini cycles of boom and crisis throughout the 1990s. Whereas the former cycle relied on domestic surplus creation via squeezing wage incomes, the latter mostly relied on foreign finance under conditions of high wages.

We follow the microeconomic swings across the individual subsectors within manufacturing from Table 1. Given our criterion of distinguishing individual sectors as competitive *versus* imperfectly competitive based on their CR4 ratios, we observe that eighteen of the twenty-nine sectors fall under the "imperfectly competitive and oligopolistic" group in 1980. Eight of them have CR4 ratios higher than 50 percent. By 1996 there is very little change in these subgroups. As of 1996, the share of value added of the imperfectly competitive sectors in manufacturing total reached 51 percent. Furthermore, these sectors employ 31 percent of total manufacturing employment in our database. In contrast, the output share of the imperfectly competitive sectors was 55 percent, and their employment share was 42 percent in 1980.

Leaving sector 353 (petroleum refineries) aside due to its exclusive public ownership, as of the 1994–1996 average, the highest degree of concentration is observed in:

Rubber and plastics (355)—74.8 percent
Tobacco manufactures (314)—64.5 percent
Miscellaneous petroleum and coal (354)—63.4 percent
Printing and publishing (342)—60.0 percent

It is interesting to note that the size of the public sector is not necessarily the main actor in these sectors, with public share being 0.01 in 355; 0.04 in 354; and 0.07 in 342. Sectors 321 (textiles) and 322 (wearing apparel) display the most competitive environment with respect to their CR4 ratios.

Overall, one witnesses a mixed pattern of concentration from 1980 to 1996. In general, there is very little structural shift across the two subgroups. We record 341 (paper and paper products) to be the only sector to change its imperfectly competitive status from a CR4 of 47.1 percent in 1980 to 22.6 percent in 1996. Per contra, it is interesting to note that one also witnesses a competitive sector such as manufacture of wood products (331) to increase its concentration level beyond the imperfectly competitive threshold of 30 percent by 1996.

At the expense of over-generalization, we can nevertheless confer a tendency for higher markup rates within the imperfectly competitive block. Petroleum refineries (353), soil products (361), and nonmetals (369) have the highest markup rates over 1994–1996 with 1.07, 1.04, and 0.72, respectively. On the other hand, sectors 312, 323, and 324 yield the lowest markups. We further observe that growth in real wages has been consistently negative over the 1981–1988 and 1994–1997 periods, whereas real wage costs have been on an upward trend under the financial deregulation of 1989–1993. As of 1994–1997, the highest share of labor costs in value added is recorded in manufacture of footwear (324), with 0.27. This is followed by glass products (362), with 0.25, and paper and paper products (341), with 0.24. The disassociation between the real wage movements and labor productivity is clearly visible over the classic export-led manufacturing era—1981–1988. Even though real wages seemed to have caught up with real average labor products during the 1989–1993 period, this pattern is observed to fall short of its momentum and, by 1994–1997, real wages start to follow a contractionary trend.

Econometric Investigation

We now turn to the econometric investigation of the dynamics of the Turkish manufacturing industry over the post-1980 era. To this end, we focus on the twenty-nine subsectors of manufacturing based on ISIC three-digit classification. (The ISIC codes and their sectoral identification are shown in the Appendix.)

We utilize two specifications: we first study the distributional issues and analyze the behavior of gross profit margins (markup rates) in relation to trade liberalization,

sectoral concentration, and swings in real wage costs. Second, we analyze the patterns of accumulation and study the behavior of sectoral investment (by destination) against the behavior of markup rates, real wage costs, and openness.

We continue to rely on our initial classification based on their CR4 ratios. Accordingly, we classify those sectors that have a CR4 in excess of 0.30 as "imperfectly competitive/oligopolistic," and those with a CR4 less than 0.30 as "perfectly competitive." On a different spectrum, sectors are to be regarded as "open," provided that their trade volume (measured as imports plus exports) as a ratio of sectoral value added exceeds 0.50. Per contra, sectors with trade volume-to-value-added ratios less than 0.50 are regarded as "inward-looking." We carry this classification based on the characteristics of the twenty-nine sectors in 1980. We thus obtain the classifications shown in Table 2 (see the Appendix for identification of the ISIC codes).

Data Sources

Our data come from the SIS *Manufacturing Industry Annual Surveys* and *Indicators of Concentration.* The survey covers all public sector establishments and those private enterprises employing more than ten workers.

Various concentration measures were available in addition to the CR4 ratio, such as the CR10 and the Herfindahl indices in our data. We chose to adhere to the CR4 as the relevant measure of concentration due to its simplicity and also popularity.[6] *Wage costs* include all payments in the form of wages and salaries and per diems, gross income tax, social security, and pension fund premiums. It also includes social security, pension, contributions, and the like, payable by the employer, and overtime payments, bonuses, indemnities, and payments in kind. Annual wages and salaries paid are compiled for production workers and other staff. *Profit margins* (markup rates) are defined as the ratio of total profits to total costs of wages and intermediate inputs. In the absence of reliable capital stock estimates, this variable provides a good proxy on the profitability of capital. Finally, sectoral investments are given by the annual gross fixed additions to capital stock.[7]

Method of Econometric Estimation

Our essential estimating equations are

$$MR_{it} = f(\alpha_t, O_{it}, CR4_{it}, RW_{it}) \qquad (1)$$

$$RI_{it} = f(\alpha_t, MR_{it}, O_{it}, RW_{it}). \qquad (2)$$

The first implicit function represents the trade orientation and distributional aspects of the manufacturing industry, where MR_{it} denotes markup rates, $CR4_{it}$ denotes concentration ratios, O_{it} stands for "openness" of each sector (ratio of imports plus exports to sectoral value added), and RW_{it} denotes real wage costs. The second relationship tries to explain the process of capital accumulation using

Table 2

Classification of Sectors: Turkey, 1980

	Open sectors	Inward-looking sectors
Competitive sectors	312, 322, 381, 383	311, 321, 323, 331, 352, 356, 369
Imperfectly competitive sectors	351, 353, 382, 384, 375, 390	313, 314, 324, 332, 341, 342, 354, 355, 361, 362, 371, 372

three possible determinants, namely markups, real wage costs, and the openness, where RI_{it} is the real investment of each manufacturing industry sector. The index $\{i = 1,2,...,N\}$ refers to the individual unit, and $\{t = 1,2,...,T\}$ refers to a given time period. The coefficients α_i (sector-specific composite term) have two components: α_{i1}, a sector-specific intercept; and $\alpha_{i2}t$, a sector-specific deterministic growth trend.

Each equation is estimated using a panel data estimator, so that variation over both the cross-section and time-series dimensions are jointly considered. The advantages of using panel data estimation are varied. First, panel data enable major steps to overcome the problems associated with the lack of sufficient historical data for efficient estimation using a single-sector time-series analysis. Second, it mostly compensates for the dissatisfaction with using a cross-section estimation. Since temporal variation is ignored in cross-section estimation, changes occurred in policy in the specific sectors of the manufacturing industries over the years cannot be observed. In contrast, panel data estimation uses all the information available in the time-series and the cross-section–based procedures.

Panel data estimation considers the sector-specific differences. Observed static differences between sectors of the manufacturing industries can be taken into consideration in variation in the intercept terms, α_is. The intercept is allowed to vary only across individual sectors, not over the time period under consideration. Note that, as the intercept-shifting dummy variables have been included, time-invariant regressors cannot simultaneously be introduced, as this would induce multicollinearity. There would be two types of specifications. The first one allows only one intercept coefficient and one slope coefficient on each regressor using a simple pooled regression. The second one permits the intercept to vary across sectors and the estimation technique assumes constant slope coefficients across sectors. This is less restrictive than the former.

The general form of our specifications is assumed to be linear.

For trade orientation and distribution:

$$MR_{it} = \alpha_i + \beta_1 \, O_{it} + \beta_2 \, CR4_{it} + \beta_3 \, RW_{it}. \qquad (1')$$

For accumulation:

$$RI_{it} = \alpha_t + \beta_1 \, MR_{it} + \beta_2 \, O_{it} + \beta_3 \, RW_{it}. \qquad (2')$$

Two special cases of these general forms arise, depending upon whether the sector-specific effects (α_t) have a fixed component, which is called the "fixed-effects model" (FEM), or a random component, which is called the "random-effects model" (REM). The choice of the model can be based on a priori assumptions. A priori, in the sense that we are dealing with individual sectors, and random selections from a population would support the adoption of the FEM, where inferences are restricted to the effects within the sample. However, not satisfied with looking only at a priori assumptions, we test the appropriateness of the FEM against the REM using the F-test and the Hausman chi-squared test (Hausman 1979; Hausman and Taylor 1981). The Hausman statistic tests for the correlation between the sector-specific effects and explanatory variables. If they are correlated, the fixed-effect estimator (the within, or the least squares dummy variable estimator) is consistent, whereas the random effects estimator (the feasible generalized least squares [GLS] estimator) is biased. The within estimator makes use of the variation of variables within each individual. The feasible GLS estimator is a weighted average of the within and between estimators, which utilizes variation between individuals (see Hasio 1990 and Judge et al. 1985). Rejection of the null of no correlation would lead to the adoption of the fixed-effect estimator using specifications $(1')$ and $(2')$.[8]

Analysis of Econometric Results

We employ panel data estimation on specification $(1')$ in six sets of equations. First, we estimate Equation $(1')$ for the whole sample; in other words, for $i = \{1,2,...,29\}$ and $t = \{1980,1981,...,1996\}$. Then, we take each of the identified cells as one individual group exclusively and redo the estimation. Finally, we distinguish those sectors that were "inward-oriented" in 1980, but became "open" by 1996. That is, sectors $i \in \{2 \text{ and } 4\}$ in 1980 and $i \in \{1 \text{ and } 3\}$ in 1996. This leaves us with the following sectors: {311, 314, 321, 323, 324, 331, 332, 341, 352, 355, 356, 362, 371, 372}. We classify this group with the identifier "trade adjusters."

Distributional Indicators: Behavior of Gross Profit Margins

We start our econometric investigation with the analysis of the behavior of gross profit margins (markups). Our bird's-eye-view observations on the markups, as portrayed in Figure 1, reflect a general rise of the average profit margins despite the increased openness and the secular rise of wage costs after 1989.

To test these hypotheses, we regress markup rates on openness, concentration (CR4 ratios), and logarithm of real wage costs using the panel data. The results are tabulated in Tables 3 and 4.

Table 3

Relationship Between Markup Rates, Openness, Concentration Ratio, and Real Wage Costs

	Openness	Concentration level (CR4)	Real wage costs	Adjusted R^2	F-statistic	DW test
Overall effect	−0.004*	0.181*	0.111*	0.803	1016.4*	1.23
Open and competitive	−0.002	−0.055	0.130*	0.877	242.06*	1.28
Open and imperfectly competitive	−0.003*	0.301*	0.155*	0.654	99.5*	1.56
Inward looking and competitive	0.017*	0.302*	0.183*	0.828	288.13*	1.27
Inward looking and imperfectly competitive	0.039*	−0.058	−0.104*	0.568	140.66*	1.26
Trade adjusting	0.026*	0.091	0.076*	0.781	431.79*	1.39

Note: * is statistically significant at 1 percent.

Table 4

Relationship Between Markup Rates, Openness, Concentration Ratio, and Real Wage Costs (FEM with cross-section specific effects)

Cross-section effects	Openness	Concentration level (CR4)	Real wage costs
311	−0.037*	2.548*	0.099*
312	−0.014	−0.934*	−0.134*
313	−2.457*	−0.383	−1.167*
314	−0.050	3.327	−1.331
321	0.014**	−0.829*	0.064*
322	0.002	−0.074*	0.219*
323	0.018*	0.305*	−0.021
324	0.035	−0.437*	−0.130
331	−0.016	0.927*	−0.276*
332	0.063	1.079	0.015
341	−0.026	−1.033*	−0.217*
342	−0.999	0.230	−0.486*
351	−0.040*	1.520*	−0.196*
352	0.256*	0.649	0.691*
353	−1.399*	7.777	0.838*
354	−0.906	−0.136	−0.353
355	−0.041	0.689*	0.489*
356	0.097*	1.708*	0.227*
361	−1.511	−3.002	−0.268
362	−0.291	−0.444	0.068
369	−0.572*	2.798*	0.387*
371	−0.133*	−1.524*	−0.346*
372	0.032	0.702	0.014
381	0.004	1.835*	−0.028
382	0.004	0.733*	0.157*
383	0.031*	0.130	0.167*
384	0.042*	0.333*	0.056*
385	−0.005*	0.339*	0.067
390	0.070*	0.725	0.194
Adjusted R^2	0.901		
F-statistic	53.44*		
DW test	1.7		

Notes: * is statistically significant at 1 percent; ** is statistically significant at 5 percent.

Our econometric results reveal the following relationship for the markup equation when all sectors are considered:

$$MR_{it} = \alpha_i \underset{(-5.107)}{-0.004} O_{it} + \underset{(6.361)}{0.181} \text{ CR4}_{it} + \underset{(13.108)}{0.111} \log RW_{it},$$

where α_i is the sector-specific term and t-ratios are given in parentheses. Thus, for the whole sample, the overall coefficient of openness is estimated to be a mere –0.004. The magnitude, which is found to be statistically significant at the 1 percent level, is nevertheless very small, suggesting that the sixteen years of adjustment to foreign integration has not brought a meaningful change in the market structure of the Turkish manufacturing industry. As such, the speed of adjustment of gross profit margins is revealed to be very slow in spite of the import discipline or export penetration, and the technological and institutional barriers to entry seem to persist over the post-1980 reform era.

Concentration rates, on the other hand, have a statistically significant and higher (positive) coefficient with 0.181 at the 1 percent level. Thus, a 1 percent increase in the level of concentration as measured through the CR4 ratio is likely to affect the average profit margin of the sector by +0.18 percent. The a priori theoretical expectation that higher concentration levels would be indicative of higher profit margins is confirmed in the aggregate. What is more interesting, however, is that markups do have a *positive* relationship with respect to real wage costs, with 0.111. These observations suggest that the sector has been characterized by Sraffian dynamics in the aggregate, with persistence of markups against wage increases. (See also Boratav et al. 2000, and Yentürk and Onaran 1999, for a further assessment of the behavior of markups against the post-1989 wage cycle in Turkish private manufacturing.)

Across the subgroups, we observe that, in general, "open" sectors (as of 1980) have a negative relationship with "openness." "Inward-looking" (as of 1980) sectors, on the other hand, display a positive relationship against the same variable. Most important, "trade adjusters" carry a coefficient of +0.026 vis-à-vis openness. Thus, for those sectors that were inward-looking by 1980, the process of opening could not have been associated with a competitive discipline squeezing the cost margins (markups). On the contrary, there seems to be evidence that the inward-looking sectors (as of 1980) adjusted the new trade environment by way of increasing their profit margins (with an estimated coefficient of +0.026 vis-à-vis openness). Trade adjusters, as a group, displayed positive coefficients in relation with the concentration indicator (CR4) and the real wage costs. Except for the "inward-looking and imperfectly competitive" group, markups have a positive relationship with real wage costs under all groups. Thus, generally speaking, it seems that the manufacturing sectors could have responded to the shocks of trade policy and the real wage costs by increasing their profit margins over the post-1980 reform era.

At a finer level of detail of the ISIC three-digit classification, individual branches display much variation. Overall, among the statistically significant results, markups

respond negatively to openness in seven subsectors, and positively in seven subsectors. The sector that has the highest negative coefficient is the beverage industry (313). Petroleum industries (353) and nonmetals (369) also have significantly high negative coefficients. Sector 353, however, is a pure public monopoly, and its pricing behavior is likely to be attributable to mostly political factors.

On the other end of the spectrum, in the equations of important intermediate goods producers, such as chemicals (352), plastics (354), and electrical machinery (383), openness has relatively high positive responses on profit margins with +0.256, +0.097, and +0.0031, respectively. Within the "trade adjusters," only food manufacturing (321) and iron and steel (371) display statistically significant, negative, coefficients vis-à-vis openness.

When we analyze the sectoral effects of concentration and real wage movements against the markups, we witness higher responsiveness coefficients. The most important sectors displaying high coefficients between concentration and profit margins are:

Nonmetallic minerals (369)—2.798
Food Processing (311)—2.548
Metal products (381)—1.835
Plastics (356)—1.708
Chemicals (351)—1.520

Except for chemicals, all of these sectors disclose positive coefficients of real wage costs on markups as well. In fact, counting only the statistically significant results, of the eleven sectors that had positive relationship between markups and the concentration levels, seven carry positive responsiveness vis-à-vis real wage costs. These findings provide supporting evidence confirming the hypothesis that increased real wage costs could have been translated into higher markups via power of market concentration. The sectors that revealed the highest positive relationship between markups and real wage costs are:

Petroleum refineries (353)—0.838
Other chemicals (352)—0.691
Rubber products (355)—0.489
Nonmetals (369)—0.387
Plastic products (356)—0.227

In summary, our econometric results reflect a pattern of sluggishness of the existing levels of concentration and markup-induced noncompetitive pricing in Turkish manufacturing against a sixteen-year period of trade liberalization adjustments. With a relatively small rate of change of markup rates (averaging –0.004 for the whole period), the sector seems to display a resistance to increased competition despite the import discipline the post-1980 adjustments have brought. It is also notable that the sectors that are characterized by high concentration coefficients do not necessarily reflect high shares of public ownership and that reduc-

tions in the share of the public companies in the sector do not lead directly to an increase in the degree of competitiveness. In this respect, comparing the data for 1980 and 1996, one can see that there are sectors in which concentration rates (CR4) have declined parallel to a decrease in the share of the public sector (iron and steel [371], beverages [313], paper and paper products [341]), whereas there have also been sectors (chemicals [351], tobacco [314]) in which monopolization increased as a result of the same process. These observations reveal that, contrary to expectations of the orthodox theory, the process of trade liberalization has, in general, been insufficient to introduce the expected increase in competition in the industrial commodity markets. This verdict brings us to issues of distribution and pricing.

Investment Behavior and Patterns of Accumulation

Now we turn our attention to the analysis of the behavior of sectoral investment in response to openness, markup rates (profitability), and real wage costs by regressing the logarithm of sectoral real investments against CR4, *MR,* and the logarithm of *RW* (Equation (2′)). Results are tabulated in Tables 5 and 6.

The overall effect of profit margins on manufacturing real investment is quite strong with an elasticity of 0.548. This suggests the presence of strong accelerationist investment patterns in the sector. Openness is not found to be statistically significant.

The estimated equation has been found to be

$$\text{Log } RI_{it} = \alpha_i + \underset{(5.956)}{0.548} \ MR_{it} + \underset{(1.439)}{0.035} \ O_{it} + \underset{(15.063)}{0.841} \ \text{Log } RW_{it}.$$

The most interesting result is the estimated positive elasticity of real wages on real investment with a coefficient of +0.841, which is statistically significant at the 1 percent level. In other words, real wages seem to act as an accelerationist variable, stimulating real fixed investments in the manufacturing sector, whereas the effect of openness—as measured in ratios of trade volume to value added—has been found to be insignificant. The unorthodox behavior of real wages in stimulating both gross profit margins and real investments in a positive manner suggests the continued importance of domestic demand factors in the Turkish industrial commodity markets. These results concur with the findings of Yentürk and Onaran (1999) in their classification of the post-1980 Turkish manufacturing as following a *wage-led* growth pattern.

Sectoral responses of investment to markups have generally very high coefficients. Sectors such as transport equipment (384), textiles (321), professional equipment goods (385), and printing (341) have coefficients exceeding 2.0. It is interesting to observe that across the above-identified sectors, only textiles (321) carry a statistically significant relationship of the effect of trade openness. Furthermore, we witness two sectors, printing (341) and nonferrous metals (372), with

Table 5

Relationship Between Real Investment, Markup Rates, Openness, and Real Wage Costs

	Markup rates	Openness	Real wage costs	Adjusted R^2	F-statistic	DW test
Overall effect	0.549*	0.035	0.841*	0.979	10666.1*	0.88
Open and competitive	1.975*	0.016	0.934*	0.963	863.83*	1.11
Open and imperfectly competitive	0.207	0.004	0.700*	0.983	2951.8*	0.95
Inward looking and competitive	0.456*	0.297*	0.917*	0.992	7646.20*	0.796
Inward looking and imperfectly competitive	0.428*	0.249*	0.661*	0.907	934.75*	1.23
Trade adjusting	0.433*	0.271*	0.806*	0.991	3778.63	1.12

Note: * is statistically significant at 1 percent.

Table 6

Relationship Between Real Investment, Markup Rates, Openness, and Real Wage Costs (FEM with cross-section specific effects)

Cross-section effects	Markup rates	Openness	Real wage costs
311	0.096	0.451*	0.948*
312	0.991	0.379*	0.476
313	1.081*	3.106*	2.244*
314	0.602*	0.949*	2.222*
321	2.180*	0.445*	0.054
322	10.847	0.134	3.153
323	−0.894	0.336*	−0.245
324	1.778*	0.194*	0.618*
331	1.446*	0.154	1.666*
332	0.556	0.163	0.509
341	2.188*	0.147	−0.189
342	0.218	−2.164*	−0.615**
351	−0.129	−0.095	0.089
352	−0.157	0.578*	1.311*
353	0.565	−0.294	−0.674
354	0.090	−0.097	0.806*
355	0.460	0.636	0.625
356	0.492	0.863*	1.204*
361	1.016*	1.848*	0.607*
362	1.137	1.325	0.715
369	1.230	−0.160	−0.227
371	1.464	0.325	0.540
372	0.253	−0.081*	−0.267*
381	1.662	−0.540	1.205*
382	−0.096	0.152*	0.687*
383	−0.489	0.547*	0.921*
384	3.159*	0.042	0.872*
385	2.459	0.029	2.580*
390	0.699	0.161	0.971
Adjusted R^2	0.992		
F-statistic	674.48*		
DW test	1.65		

Notes: * is statistically significant at 1 percent; ** is significant at 5 percent.

negative elasticities of investment with respect to real wages, with –0.615 and –0.267, respectively. The highest effect of real wages on investment is found in beverages (313), with +2.244. This is followed by tobacco manufacturing (314), with +2.222; wood products (331), with 1.666; and other chemicals (352), with 1.311.

Concluding Comments

In this paper, we investigated the structural consequences of the post-1980 outward-orientation on the market concentration, pricing behavior, and accumulation patterns in Turkish manufacturing industries. Utilizing existing evidence on the extent of monopolization and high concentration in the Turkish manufacturing industries, we attempted to formalize on these observations to deduce econometric hypotheses on the patterns of trade liberalization, accumulation, and profitability. To this end, we investigated our empirical questions using various panel data procedures over twenty-nine subsectors of Turkish manufacturing for the 1980–1996 period.

Existing data reveal very little structural change in the sectoral composition and nature of market concentration and behavior of profit margins under the post-1980 Turkish structural adjustment reforms and outward-orientation. It is also notable that the sectors that are characterized by high concentration coefficients do not necessarily reflect high shares of public ownership, and that reductions in the share of the public companies do not lead directly to an increase in the degree of competitiveness. As such, the speed of adjustment of concentration is revealed to be very slow in spite of the import discipline or export penetration, and the technological and institutional barriers to entry seem to persist over the post-1980 reform era.

We found that "openness" had very little impact, if any, on the levels of profit margins (markups) and also on the behavior of sectoral investments. Our econometric results reflect a pattern of sluggishness of the existing levels of markups in Turkish manufacturing against a sixteen-year period of trade liberalization adjustments. With a relatively small effect of "openness" on gross profit margins (averaging –0.004 for the whole period), the sector seems to display a resistance to increased competition despite the import discipline the post-1980 adjustments have brought. In fact, those "trade adjusting" sectors that were classified as "inward-looking" in 1980, and became "open" by 1996, display a positive response (+0.026) of profit margins vis-à-vis openness. Thus, our results suggest that, contrary to the prognostications of the orthodox theory, the post-1980 export orientation of Turkish manufacturing could not lend itself into gains in competitiveness and could not be sustained as a viable strategy of "export-led industrialization" via increased investments. As well, producers' expectations regarding the credibility of the liberalization program and time-consistency of the policies are among the relevant discussion subjects.

Profit margins (markups) are further found to be positively and significantly affected from concentration power and real wage cost increases. Thus, there seems

to be evidence that the manufacturing sectors have responded to shocks of trade policy and real wage costs by increasing their indigenous profit margins. Real investments, in turn, have been found to have a statistically *in*significant relationship with "openness"; yet, significant and positive responses to profit margins and real wages. This finding suggests the continued importance of the domestic demand factors in the Turkish industrial commodity markets and an overall wage-led growth pattern with both profit margins and real wages acting as accelerationist variables to stimulate fixed investments.

Notes

1. See, for instance, Boratav et al. (2000), Bulutay (1995), Ercan (1999), Filiztekin (1999), Kepenek (1996), Köse and Yeldan (1998a, 1998b), Maraslíoglu and Tĕktĕk (1991), Metin-Ozcan et al. (1999), Onaran (2000), Pamukçu and de Boer (1999), Sĕnses (1996), Uygur (1996), Yeldan (1995), and Yentürk (1997, 1999).

2. See, for instance, Günes˙ (1991), Katĕrcĕoglu (1990), Kaytaz et al. (1993), and Sǎhinkaya (1993) for the evaluation of market concentration and patterns of oligopolistic markup pricing in the industrial commodity markets. Günes˙et al. (1996), in turn, document comprehensive panel data on the degree of concentration in Turkish manufacturing using the standard input–output classification for the 1985–1993 period.

3. This is the threshold used by Boratav et al. (2000) and Yeldan and Köse (1999), where, on a further level of finesse, the sectors that had CR4 ratios between 30 percent and 49 percent are classified as "monopolistically competitive," and the sectors with CR4 ratios exceeding 50 percent are regarded to be "oligopolistic."

4. See Boratav and Türel (1993), Celasun (1994), Celasun and Rodrik (1989), Sĕnses (1994), and Uygur (1993) for a thorough overview of the post-1980 Turkish structural adjustment reforms. For a quantitative assessment of the export-subsidization program, see Milanovic (1986) and Togan (1993).

5. See Balkan and Yeldan (1998), Boratav et al. (1996), Ekinci (1998), Özatay (1999), Selçuk (1997), and Yentürk (1999) for an extensive discussion of the post-financial liberalization macroeconomic adjustments in Turkey.

6. Given that the idea of "seller concentration" refers to the size distribution of firms that sell a particular product, the concept is usually regarded as a significant dimension of market structure since it is thought to play an important part in determining market power. Some researchers who have been studying market power have sought to measure it by using indices based on microeconomic theory dating back to Lerner (1934), who suggested that the difference between price and marginal cost divided by price could serve as a direct measure of departures from the competitive ideal. Despite its intuitive appeal, the Lerner index is criticized on the grounds that it is essentially an ex post measure of allocative efficiency. Curry and George (1983) provide a thorough evaluation of these issues.

7. For more detailed information on these and related concepts, see the SIS *Manufacturing Annual Industry Surveys* and the SIS Web site at www.die.gov.tr.

8. We estimated three specifications, one with

$$MR_{it} = \alpha + \beta_1 O_{it} + \beta_2 CR4_{it} + \beta_3 \log RW_{it} + \beta_4 D_1 + \beta_5 D_2 + \beta_6 D_1 O_{it} + \beta_7 D_2 O_{it},$$

where D_1 is a dummy for open sectors taking a value of one and inward-looking sectors taking a value of zero. D_2 is a dummy for competitive sectors taking a value of one and imperfectly competitive ones taking a value of zero. $D_1 O_{it}$ and $D_2 O_{it}$ are respective interaction dummies with the openness. α, β_1, β_2, and β_3, are common intercept and slope coefficients,

respectively. This specification is estimated using pooled least squares for all sectors. The second one is an unrestricted form of the former specification written as

$$MR_{it} = \alpha_{t_i} + \beta_1 O_{it} + \beta_2 CR4_{it} + \beta_3 \log RW_{it} + \beta_4 D_1 O_{it} + \beta_5 D_2 O_{it},$$

and estimated as a fixed-effect model, where α_{t_i} is estimated as the intercept term of each respective sector.

Using an F-test, we tested the null hypothesis of pooled ordinary least squares (OLS) against the alternative of an FEM. The F-test favors FEM (F = 26.8 $F_{26, 455}$ = 1.70 at α = 0.01). The same equation is estimated using REM and specified as

$$MR_{it} = \alpha + \alpha_{t_i} + \beta_1 O_{it} + \beta_2 CR4_{it} + \beta_3 \log RW_{it} + \beta_4 D_1 O_{it} + \beta_5 D_2 O_{it},$$

where α is a common intercept and α_{t_i} is considered an intercept in the REM, namely residuals. The null here is REM, and the alternative is FEM. Using an F-test, we reject the null (F = 2.03 and $F_{28,455}$ = 1.46 at α = 0.05). This type of testing was also performed in considering Equation (2′) and the results consistently favor FEM. The Hausman χ^2 test also concludes that a contemporaneous correlation between the residuals and the explanatory variables does exist for Equations (1′) and (2′), where each test statistic is found to be greater than $\chi^2_{(1)}$ = 3.84 at a 5 percent significance level. Estimation results are not provided here, but can be requested from the authors.

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Appendix

Industrial Classification of All Economic Activities

Manufacturing Industry Classification

311   Food manufacturing
312   Manufacture of food products not elsewhere classified
313   Beverage industries
314   Tobacco manufactures
321   Manufacture of textiles
322   Manufacture of wearing apparel, except footwear
323   Manufacture of leather and products of leather, leather substitutes, and fur, except footwear and wearing apparel
324   Manufacture of footwear, except vulcanize or molded rubber or plastic footwear
331   Manufacture of wood and wood cork products, except furniture
332   Manufacture of furniture and fixtures, except primarily of metal
341   Manufacture of paper and paper products
342   Printing, publishing, and allied industries
351   Manufacture of basic industrial chemicals
352   Manufacture of other chemical products
353   Petroleum refineries
354   Manufacture of miscellaneous products of petroleum and coal
355   Manufacture of rubber products
356   Manufacture of plastic products not elsewhere classified
361   Manufacture of pottery, china, and earthenware
362   Manufacture of manufacture of glass and glass products
369   Manufacture of other nonmetallic mineral products
371   Iron and steel basic industries
372   Nonferrous metal basic industries
381   Manufacture of fabricated metal products, except machinery and equipment
382   Manufacture of machinery (except electrical)
383   Manufacture of electrical machinery, apparatus, repairing, appliances, and supplies
384   Manufacture of transport equipment
385   Manufacture of professional, scientific measuring, and photographic and optical goods
390   Other manufacturing industries