Estimates of the economic contributions of the bidi manufacturing industry in India

Arindam Nandi,[1] Ashvin Ashok,[1] G Emmanuel Guindon,[2] Frank J Chaloupka,[3] Prabhat Jha[4]

[1]The Center for Disease Dynamics, Economics & Policy, Washington, DC, USA
[2]Centre for Health Economics and Policy Analysis, McMaster University, Hamilton, Ontario, Canada
[3]Department of Economics, University of Illinois at Chicago, Chicago, Illinois, USA
[4]Centre for Global Health Research, St. Michael's Hospital, Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada

Correspondence to
Arindam Nandi, The Center for Disease Dynamics, Economics & Policy, 1616 P St NW, Ste 430, Washington, DC 20036, USA; nandi@cddep.org

ABSTRACT

Background Bidis, the most common smoking tobacco product in India, remain largely untaxed and are subject to very few regulations to discourage their use. A major argument against tax increases is the large potential loss of economic activity and employment in the bidi industry from reduced consumption.

Methods We used a nationally representative survey of unorganised bidi manufacturing firms (n=2841) in India to estimate the economic contribution of the industry.

Results We find that of the 35 states and union territories of India, the bidi industry operated across 17 states, with over 95% of its production concentrated in 10 states. Bidi manufacturing firms contributed 0.50% of total sales and 0.6% of the gross value added by the manufacturing economy in 2005–2006. The industry employed approximately 3.4 million full-time workers, which comprise about 0.7% of employment in all sectors. A further 0.7 million were part-time workers. Bidi workers were also among the lowest paid employees in India. The industry offered only 0.09% of all compensation provided in the manufacturing sector (organised and unorganised).

Conclusions Considering the relatively small economic footprint of the bidi industry in India, higher excise taxes and regulations on bidis are unlikely to disrupt economic growth at an aggregate level, or lead to mass unemployment and economic hardship among small bidi workers. On average, the economic annual output per bidi worker is about US$143, which is an order of magnitude smaller than the large economic losses from the several hundred thousand deaths due to bidi smoking per year.

INTRODUCTION

Tobacco smoking caused the deaths of about 1 million Indians per year as of 2010, 70% of which occurred among individuals between the ages of 30 and 69.[1] According to the Global Adult Tobacco Survey (GATS India 2009–2010), there were 120 million smokers of age 15 years or above in India in 2010. With roughly 10% of the world's 1.3 billion smokers, India is the second largest consumer of tobacco in the world.[2]

Without widespread cessation, tobacco smoking is expected to lead to the premature deaths of over 50 million smokers currently alive.[3]

Although cigarettes are displacing it,[4] bidi[i] is still the most popular smoking tobacco product in India with a current market share of 85%.[2] [5] The health impacts of bidi smoking include higher risks of contracting oral cancer, tuberculosis and other respiratory or vascular diseases.[6] Compared with otherwise similar non-smokers, male and female bidi smokers lose 6 and 8 years of life, respectively.[1] Tobacco-related illnesses[7] [8] impose a huge economic burden as well as impoverishing approximately 15 million Indians every year.[9]

Beyond the burden imposed on smokers, the bidi industry also poses health risks for bidi workers, especially women and children working from home. As noted in the International Labour Organization (ILO) 2001 report, bidi workers suffer from: "Postural problems (neck and low back pains), abdominal pains, eye problems, burning sensation in the throat, cough, asthma, T.B., bronchitis, excessive bleeding during menstruation, irregular and painful menstrual cycles, leucorrhea, anemia, anemic body aches, dizziness from constant exposure to tobacco dust".[10] A large literature has examined the health effects on bidi workers in India to reveal similar respiratory, dermatological, ophthalmic and podiatric issues.[6] [7] [11–15]

Thus, curtailing the prevalence of bidi smoking significantly improves health conditions of both smokers and bidi workers. Higher taxation of tobacco products is the single most effective intervention to reduce consumption.[16] It is estimated that a 10% rise in bidi prices would reduce consumption ranging from 6% to 9.5% in India.[3] [17] Jha et al[4] estimate that raising the sales tax on bidi from 7% to 33% would generate Rs. 24.1 billion in tax revenue, make 11 million bidi smokers quit and prevent 21.4 million youth below age 15 from starting to smoke bidis.

In a review of the bidi taxation regime in India, Sunley[18] points to several factors that have lowered tax contributions of the already under-taxed bidi industry. Differences in taxes on handmade and machine-made bidis, excise exemptions for small producers producing fewer than 2 million bidis and intermittent and very moderate increases in excise duties are particularly noteworthy.[ii] The chaotic tax structure makes small impacts on retail prices and fails to discourage consumption (taxes only constitute 7% of retail prices). It also makes it extremely difficult to adjust prices of bidis with income

---

[i]Bidi is made by rolling a small amount of tobacco inside *tendu* (or *kendu*) leaf.

[ii]One of the points made in the study is how the excise rate for handmade bidis in 2005/2006 was lower than the rate in 1996/1997 (in terms of 2007/2008 rupees). As of the budget of 2012–2013, the central government raised basic excise duty on hand-rolled bidis from Rs.8 to Rs.10 per thousand and on machine-rolled bidis from Rs.19 to Rs.21 per thousand bidis.[18]

growth and inflation.[4] Furthermore, there are no data on the collection rates of various taxes levied on bidis, making it impossible to evaluate the effectiveness of the current tax regime. As a result, researchers have strongly argued in favour of a rationalised and simplified tax structure for tobacco products in India.[4]

The argument against government action to curb bidi smoking has two components. The demand side perspective argues that smokers derive utility from smoking, despite having full information about the ill effects of tobacco consumption. Bidis are often viewed as a cheap source of utility for the poor, a form of indulgence that improves their quality of life.[6] However, as other researchers argue,[17 18] there are considerable market failures including imperfect information, and the health and financial externalities, caused by smoking.

The dominant argument against raising taxes on bidis, despite their harmful effects, is the perception that such a move would be 'antipoor' and would ignore the "economic and social fallouts of tobacco control",[iii] especially as job losses in the bidi industry could eliminate the only source of livelihood for millions of rural workers. The bidi industry is often described as a small-scale household-level industry,[2] and it is claimed that consumption taxes, by reducing demand, will have a negative effect on the bidi industry and in turn harm overall economic growth.

However, these supply side arguments are based on anecdotal evidence. The lack of precise estimates on economic parameters such as employment, production or compensation in the bidi industry contributes to uncertainty about the consequences of potential tobacco control actions. This paper is one of the first attempts to deconstruct this supply side debate. We use firm-level data from the 2005/06 National Sample Survey (NSS) to estimate the economic contributions of the unorganised sector of the bidi industry (which comprises 90% of all bidi production) in India. We then place these estimates in a broader context by measuring the relative size of the contributions with respect to the entire manufacturing industry and also by comparing with other industries.

STRUCTURE OF THE BIDI INDUSTRY IN INDIA
Bidi manufacturing is labour intensive, and bidi rolling, which employs the majority of the workforce, is done in almost all major states of India.[10] The industry produces between 750 billion and 1.2 trillion bidi sticks per year.[18] According to Das,[19] there are about 300 major brands of bidis, but there are thousands of small-scale manufacturers and contractors who account for the bulk of the bidi production in India. One representation of the fragmented nature of the industry is the fact that none of the 300 major brands command even 5% market share in India.[4 6 19]

Existing studies of the bidi industry[6 20] point out that the production of bidis is organised in two main forms—factory/outsourced and contractual systems. In the formal factory system, manufacturing is carried out within factory premises and under the direct supervision of managers/owners. Bidi rolling work is also sometimes outsourced to branches or other companies, which operate on behalf of the factory owners. However, only about 10% of bidi manufacturing takes place within this formal/organised system.[10]

Under the more common contractual system, a contractor/middleman supplies raw materials to workers who roll bidis in their homes and return them to the contractor. This system has shifted bargaining power away from workers to middlemen and owners who often cheat workers out of their wages.[iv 21 22]

The bidi manufacturing sector's low-fixed capital requirements and high-wage sensitivity have enabled a transition from the formal factory-based system to the informal home-based system. Regulations designed in the 1960s and 1970s to improve worker welfare, which targeted the formal sector, also accelerated the transition towards contractual arrangements.[v] Years of lobbying have created complex tax and regulatory incentives that favour small-scale bidi firms (relative to larger organised firms). Moreover, opportunities for tax avoidance have encouraged the fragmentation of this industry though ownership is still concentrated among a few entrepreneurs or large holding firms.[4 6] This structural shift in the industry thereby rendered welfare regulations ineffective for the majority of workers.[20 23 24]

According to official government estimates, there were about 4.2–4.4 million workers (including both part-time and full-time workers) in the bidi industry in 2002,[18 25] and a majority of them were home-based women workers and children.[26–29] ILO 2001 report discusses the socioeconomic composition of the bidi workforce. Most workers belong to poor and landless households or socioeconomically disadvantaged castes (especially belonging to the government designated category of castes referred to as 'other backward classes' or OBC).[vi 10] Muslim women are dominant in bidi work in some states, and studies link this to social norms and religious strictures.[30–32] Children are sometimes employed with the notion that their smaller hands are suitable for folding bidi ends and tying threads.[22 28 32]

DATA AND METHODS
We use firm-level data from the NSS 62nd round (2005–2006) of India. A special questionnaire (Schedule 2.2—Unorganised Manufacturing Sector) of this survey collected data on 82 897 unorganised manufacturing enterprises in 4798 villages and 5125 urban blocks of India. An 'enterprise' is an organisational category in the data—approximately 98% of these enterprises were proprietary (ie, operations owned by households or individuals) with an average workforce size of just over two workers. The survey collected information on various characteristics of each firm, such as the location, nature of ownership and operations, along with economic activities, including production, sales, expenses, value added, asset holding, employment and labour earnings.

The surveyed firms are classified according to the National Industry Classification (NIC 2004) code of India. For our analysis, we only consider the subsample of 2841 bidi manufacturing firms (NIC code 16002). From this, we estimate that there were over 2.7 million small, unorganised bidi enterprises in India during 2005–2006. We present estimates of the following economic activities of these firms—sales, gross value added (GVA), employment and compensation.[vii]

[iii]As expressed in former Indian Prime Minister AB Vajpayee's speech on 7 January 2000 at the World Health Organization Conference, New Delhi.

[iv]For example, middlemen reject rolled bidis at the procurement stage even though they are to blame for offering low quality leaves and underweighted raw materials.
[v]The Bidi and Cigar Workers (Conditions of Employment) Act of 1966 in India, discussed later, is one such example.
[vi]The Indian government categorises socioeconomically disadvantaged caste groups into three subgroups named scheduled castes, scheduled tribes and other backwards classes.

Table 1 Estimated share of bidi receipts in bidi-producing states of India

State	Total bidi receipts (INR millions)	Bidi sales as % of unorganised manufacturing sector	Bidi sales as % of all manufacturing sector
West Bengal	7320	2.52	1.80
Tamil Nadu	5953	2.85	1.09
Andhra Pradesh	3487	3.35	1.13
Madhya Pradesh	3013	4.23	1.94
Bihar	2696	7.19	6.12
Karnataka	2434	1.73	0.64
Uttar Pradesh	2215	0.73	0.44
Jharkhand	2118	6.73	1.24
Orissa	726	1.48	0.58
Gujarat	646	0.32	0.08
Kerala	443	0.41	0.28
Maharashtra	284	0.05	0.02
Tripura	104	1.01	0.91
Assam	71	0.21	0.10
Rajasthan	66	0.07	0.03
Chhattisgarh	32	0.08	0.03
Daman & Diu	1	0.02	0.00
All India	31 609	1.18	0.50

Source: NSS Round 62 Schedule 2.2 (July 2005–June 2006) data. Receipts are based on the survey statistics and estimated to population level using sample weights. All manufacturing sector contributions include organised sector contributions as well. These were obtained from Annual Survey of Industries (2005–2006). Percentage estimates reported for the all India level include unorganised manufacturing industry and organised manufacturing industry economic activities in non-bidi-producing states. INR, Indian Rupees; NSS, National Sample Survey.

Also, as with every industry, the bidi industry has various forward and backward linkages. It uses inputs such as raw materials from the tobacco and *tendu* leaf farming sectors, and there may be a distribution and retail network for the final product. Any change in economic activities in the bidi industry may affect these allied sectors. However, due to lack of data on the economic linkages of the bidi industry, in this paper we do not analyse the allied sectors.

RESULTS
Annual sales and GVA
Tables 1 and 2 present state-wise annual turnover and GVA by the Indian bidi industry. The estimated total sales of the industry, for the year 2005–2006, was Rs. 31.6 billion, approximately 0.5% of total sales of all manufacturing and about 1.8% of total sales of all unorganised manufacturing.[viii] [ix] West Bengal and Tamil Nadu had the highest sales, Rs. 7.3 billion and Rs. 5.9 billion, respectively, about 1.8% and 1.1% of all manufacturing sales (organised+unorganised), respectively, in these states. In

Bihar, the bidi industry is relatively more important, accounting for 7.2% and 6.1% of unorganised manufacturing and all manufacturing sales, respectively. In Jharkhand, bidi sector receipts constitute a significant share of all unorganised manufacturing receipts (6.7%). However, its receipt share of total manufacturing (organised and unorganised) diminishes to 1.2%. At the national level, the bidi industry contributed about 0.1% to the national gross domestic product (GDP) during 2005–2006. To put this contribution in perspective, a sector with political influence such as textiles, which is considered large and whose economic contributions are considered vital, contributes between 4% and 5% to GDP (see table 3).

GVA is an important indicator by which the economic contribution of the bidi manufacturing industry can be assessed. In fact, it presents a better picture of the contribution (value added) of the industry as compared with sales. The NSS estimates GVA by deducting 'total operating expenses' from 'total receipts'.[x] Total receipts are defined as the sale value of all products and by-products manufactured by an enterprise along with the value of all services dealing with entrepreneurial activities. On the other hand, total operating expenses include the value of raw materials, electricity, fuel, lubricants and auxiliary materials consumed; cost of maintenance, services purchased and other expenses incurred by an enterprise during the reference period that lies between July 2005 and June 2006.[35]

Based on this definition, we estimate a total GVA of Rs. 26.1 billion (2005 INR) for the bidi industry, which is 0.6% of GVA of the entire manufacturing sector nationally. The only other significant study examining GVA in the industry is an older report that compared bidi and cigarette industries in India during 1994–1995 and found that the GVA of bidi industry at Rs. 61 billion was comparable to the Rs. 65 billion (1994 INR) GVA contribution by the cigarette industry.[36] This estimate is much larger as it also included forward and backward linkages to the industry, although it excluded tendu leaf operations.

At a state level, West Bengal and Tamil Nadu are again the leading states in GVA contribution with Rs. 5.3 billion and Rs. 3.6 billion, respectively (see table 2). As a share of GVA in all unorganised and total manufacturing, the bidi sector of Bihar contributes 12.9% and 9.7%, respectively. Similarly, in Jharkhand, the bidi sector comprises a larger share of GVA of unorganised manufacturing (15.2%). However, the presence of a large organised sector in Jharkhand implies that its GVA contribution as a share of all manufacturing activities is significantly smaller (1.4%).

Measures such as GVA per worker and GVA per firm reflect significant differences in productivity across states. By this measure, Assam (23 710) and Gujarat (19 861) have the highest GVA per firm while Tamil Nadu (11 109) and Gujarat (10 964) yield the highest GVA per worker.

We also test the notion that bidi production is largely based in rural India. We find that although 78.5% of the overall bidi industry GVA can be attributed to rural production, there is significant variation across states. While states like Jharkhand (99%), Orissa (98%) and Gujarat (94%) derive most of bidi GVA from the rural sector, Tamil Nadu (54%) and Madhya Pradesh (58%) are less dependent on the rural sector for GVA contributions.

[vii]The survey also collected data on a few unorganised cigarette-producing firms. However, due to the small size of the sample (less than 30), and the organised nature of the vast majority of cigarette production, we do not analyse these data in this paper.

[viii]The average exchange rate during year 2005–2006 was US$1 = Rs. 44.3 (Reserve Bank of India). Also, to put these estimates in perspective, the annual average wholesale price index (base 1993–1994) in 2005–2006 was 195.6, yielding a total sales of Rs. 161.6 million in 1993–1994 constant prices.

[ix]We estimate the total production of approximately 1.02 trillion bidi sticks from our NSS data. However, NSS does not separately provide data on sold and unsold inventory.

[x]There are other methods of calculating GVA, such as the modified apportioning method used by the National Commission for Enterprises in the Unorganized Sector (NCEUS) of India .[34] However, due to lack of data, such analysis is beyond the scope of our study.

Table 2 Estimated share of GVA in bidi producing states

State	Total bidi GVA (INR millions)	Share of rural sector of bidi GVA (%)	Bidi GVA per firm (INR)	Bidi GVA per worker (INR)	Bidi GVA as % of unorganised manufacturing sector	Bidi GVA as % of all manufacturing sector
West Bengal	5283	91.23	7478	5355	6.32	2.63
Tamil Nadu	3574	54.60	15 431	11 109	4.35	0.85
Andhra Pradesh	3272	77.15	8861	7907	7.12	1.28
Madhya Pradesh	2780	57.54	7788	3952	11.03	2.51
Bihar	2610	93.94	17 172	8770	12.87	9.68
Karnataka	2353	73.38	7678	6353	4.65	0.80
Uttar Pradesh	2144	75.84	9421	5100	2.20	0.73
Jharkhand	2075	99.17	8750	6621	15.20	1.35
Orissa	712	98.42	8868	5302	3.66	0.73
Gujarat	480	94.01	19 861	10 964	0.77	0.08
Kerala	331	80.37	8200	7101	0.97	0.38
Maharashtra	265	69.53	5540	3840	0.19	0.03
Tripura	99	99.78	10 681	8519	2.93	2.18
Assam	68	65.23	23 710	9862	0.50	0.12
Rajasthan	65	NA	9088	5542	0.17	0.05
Chhattisgarh	30	81.02	11 549	5498	0.35	0.03
Daman & Diu	0.44	0.00	6754	4065	0.07	0.00
All India	26 141	78.52	9329	6289	3.11	0.58

Source: NSS Round 62 Schedule 2.2 (July 2005–June 2006) data. Receipts are based on the survey statistics, and estimated to population level using sample weights. All manufacturing sector contributions include organised sector contributions as well. These were obtained from Annual Survey of Industries (2005–2006). Percentage estimates reported for the all India level include unorganised manufacturing industry and organised manufacturing industry economic activities in non-bidi-producing states. The share of rural sector GVA for bidi industry was not available for Rajasthan possibly due to missing data.
GVA, gross value added; INR, Indian Rupees; NSS, National Sample Survey.

Employment and wages

Bidi manufacturing employment estimates are presented in table 4. We estimate that 4.16 million workers were employed in bidi manufacturing in 2005–2006.[xi] Of this, 3.42 million workers were engaged in full-time work while 0.74 million workers were employed part time. The bidi sector accounts for about 11% of unorganised manufacturing employment, and full-time workers comprised about 0.74% of total employment in India, estimated at about 457 million formal workers in 2004.[38] Including full-time and part-time workers, the bidi sector contributed 0.9% of total employment. The above estimates for the number of workers (which include owners, hired workers and helpers—who may not necessarily receive a regular wage[39]) are considerably lower than trade union claims of as many as 10 million bidi workers.[40] In comparison, large industries such as textiles directly employ about 35 million workers (table 4). The handloom sector, which is a cottage industry and structurally similar to bidi (both are unorganised home-based industries with labour inputs from women and children too), employs about 6.5 million people.[41]

At the state level, West Bengal (987 000) and Madhya Pradesh (703 000) employ the most bidi workers, while Madhya Pradesh (40%) and Jharkhand (33%) account for the highest employment contribution as a share of all unorganised manufacturing employment. Among bidi-producing states,

Jharkhand employed a total of 11.7 million people across all industries of which the bidi industry accounted for about 2.7% of total employment. In Madhya Pradesh, bidi accounted for about 2.5% of the 28 million workers employed in the state.[38]

In a separate measurement, the Annual Report of the Ministry of Labour of India (2000–2001) estimated that 4.4 million individuals were employed in the bidi manufacturing sector.[25] However, the distribution across states in this report varies from our estimates. In the report, Madhya Pradesh was found to employ the highest number of bidi workers at 750 000, while Andhra Pradesh came second by employing 625 000 people. West Bengal, which is the largest bidi employer in our data, was found to employ 497 758 people by the Ministry report. The differences are possibly due to changes in state employment levels over time. For example, a recent government document puts the number of bidi workers in West Bengal in 2012 at 2 million.[42] This is more than twice of our estimates from the 2005–2006 NSS data, and four times the estimates of the Ministry of Labour 2000–2001 report. Also, any difference in data collection methods and estimation

[xi]Krishnamurty and Raveendran[37] have developed a Modified Current Weekly Status (MCWS) method to better measure employment. This method assigns individuals to the labour force if the majority of their half-days are in the labour force. Also, within the labour force, it uses the majority time principle to classify individuals among the two activity statuses, employed and unemployed. Due to lack of detailed data on employment status of individuals in NSS Round 62 Schedule 2.2, we use a simpler approach by considering the reported numbers of workers.

Table 3 Comparison of employment and turnover between bidi and selected major industries in India

Category	Bidi	Textile
Employment (millions)	4.16	35
Annual turnover (Rs. billion)	31.6	1350
Turnover's share of GDP (%)	0.10%	4.15%

Source: Textile employment and turnover figures obtained from NPCI (ref. 33, p.9). Bidi statistics obtained from NSS Round 62 Schedule 2.2 (July 2005–June 2006) data. GDP figure for 2005–2006 obtained from indiastat.com at 2004–2005 constant prices.
GDP, gross domestic product; NSS, National Sample Survey.

Table 4 Estimated share of bidi employment in bidi-producing states

State	No. of full-time (FT) workers	No. of part-time (PT) workers	Total no. of workers	Bidi employment as % of unorganised manufacturing sector	FT bidi employment as % of total employment in all sectors	Bidi employment as % of total employment in all sectors
West Bengal	707 163	279 418	986 581	18.0	2.2	3.1
Madhya Pradesh	512 505	190 982	703 487	40.4	1.8	2.5
Uttar Pradesh	343 418	76 895	420 313	7.9	0.5	0.6
Andhra Pradesh	393 466	20 285	413 751	14.1	1.0	1.1
Karnataka	357 652	12 769	370 421	18.8	1.3	1.4
Tamil Nadu	286 640	35 060	321 700	9.5	0.9	1.0
Jharkhand	285 059	28 383	313 442	33.0	2.4	2.7
Bihar	279 238	18 400	297 638	20.5	1.0	1.1
Orissa	91 945	42 279	134 224	6.6	0.6	0.8
Maharashtra	58 064	10 894	68 958	2.4	0.1	0.1
Kerala	40 286	6365	46 651	3.4	0.3	0.4
Gujarat	33 472	10 321	43 793	2.4	0.1	0.2
Rajasthan	8988	2745	11 733	0.9	0.0	0.0
Tripura	11 523	108	11 631	8.0	–	–
Assam	4574	2333	6907	1.1	0.0	0.1
Chhattisgarh	1777	3594	5371	1.2	0.0	0.0
Daman & Diu	22	86	108	1.3	–	–
Total	3 415 790	740 918	4 156 708	11.4	0.7	0.9

Source: NSS Round 62 Schedule 2.2 (July 2005–June 2006) data. Numbers employed are weighted estimates based on survey statistics. Percentage estimates reported for the all India level include unorganised manufacturing industry employment in non-bidi-producing states. Employment in all sectors is from Planning Commission statistics on absolute employment for year 2004–2005.
NSS, National Sample Survey.

techniques used by the Ministry and the NSS across states may also contribute to the difference in estimates. Since the bidi industry is primarily unorganised, only large-scale data collection exercises can generate reliable statistics. Therefore, it is no surprise that there are very few available sources of data on bidi employment.

Wage sensitivity in the bidi industry has meant that workers, especially the poor and/or rural women, have been vulnerable

Table 5 Estimated share of compensation to bidi manufacturers in bidi-producing states in India

State	Total compensation (INR)	Bidi compensation as % of unorganised manufacturing compensation	Bidi compensation as % of all manufacturing compensation
Tamil Nadu	615 853 275	2.22	0.54
West Bengal	125 057 976	0.57	0.20
Andhra Pradesh	70 319 780	0.78	0.11
Gujarat	25 699 533	0.09	0.02
Karnataka	13 401 736	0.13	0.02
Bihar	11 664 990	0.96	0.28
Uttar Pradesh	10 817 940	0.05	0.02
Kerala	10 315 604	0.08	0.03
Jharkhand	3 669 180	0.26	0.02
Madhya Pradesh	3 622 770	0.09	0.02
Assam	2 926 524	0.16	0.04
All-India	893 349 308	0.38	0.09

Source: NSS Round 62 Schedule 2.2 (July 2005–June 2006) data. Total compensation (salary+benefits) to owners and hired workers are based on the survey statistics, and estimated to population level using sample weights. Percentage estimates reported for the all India level include unorganised manufacturing industry employment in non-bidi-producing states. Compensation in all sectors is based on added calculations from Annual Survey of Industries 2005–2006.
INR, Indian Rupees; NSS, National Sample Survey.

to wage discrimination, harassment and exploitation. In West Bengal, Madhya Pradesh and Maharashtra, studies have found that the minimum wage laws were not obeyed by any bidi manufacturing firm.[30 43]

Table 5 shows that the total compensation offered to bidi workers only constituted 0.38% of compensation to workers in unorganised manufacturing and 0.09% of all manufacturing in 2005–2006. While the bidi industry employs nearly 11% of all unorganised manufacturing workers, they are not compensated in a commensurate way. In contrast, industries such as unorganised food manufacturing (2.8%) and unorganised textile manufacturing (4.3%) contribute significantly more as a share of total compensation even though they make up only 1.4% of total employment.

While advocates of the industry often use its economic contributions to argue against government action, it is important to realise that industrial transition—as determined by free market forces—are far more important for the long-term growth, rise in national income and poverty reduction in India. For example, even the handloom sector, which is similar in size and structure to the bidi industry, is experiencing a decline and a labour shift away from the industry.[44–46] Competition due to globalisation and technological shifts to powerlooms has contributed to this decline, with the government reducing its financial support to the industry over time. However, researchers find that handloom weavers have clearly coped with the market transition.[47]

Despite the evidence on the harmful effects of bidis, the resistance to bidi control policies arises more from political clout rather than from economic impact.[48] It is not justifiable to protect the bidi industry since its economic contribution is small relative to the disproportionately large public health damage from bidi smoking. Moreover, past experience from now-defunct industries shows that a smaller bidi industry may not have any impact on long-term economic growth.

Before concluding, we must note some limitations of our study. First, the NSS data used in this paper are from 2005 to 2006, the most recent years for which data on unorganised manufacturing industries are available. Therefore, we are unable to capture any changes in the structure and economic contributions of the bidi industry since 2006. Second, our NSS dataset only includes unorganised bidi manufacturing firms. There may be other organised and registered bidi firms outside the scope of survey. However, we separately examined data from contemporary Annual Survey of Industries of organised sectors in India to find very few such bidi firms. The economic output of such organised firms was negligible as compared with the unorganised bidi industry. Finally, as discussed earlier, there is strong evidence on the economic mobility and coping capabilities of displaced workers in many industries, including small-scale industries such as handloom. However, while some studies have explored transition options for bidi workers in some regions,[49] more research on the bidi industry is necessary to predict the exact nature of the mobility of workers, particularly of women and other economically vulnerable groups.

CONCLUSION

In this paper, we use firm-level data to find that the unorganised bidi manufacturing industry is a small contributor to the national economy. In a nation with roughly 457 million employed individuals, only 4.2 million full-time and part-time workers are employed by the bidi industry.[xii] At the regional level, bidi manufacturing contributes to a significant share of employment and economic activity in only a few states.

At the national level, the bidi industry's annual sales (Rs. 31.6 billion) are much smaller than economic powerhouses such as the textile industry (annual turnover of more than Rs. 1350 billion). With respect to employment, the number of workers in the bidi manufacturing sector is comparable to the handloom industry, which employs about 6.5 million people.

Although no study has attempted to estimate the impact of higher bidi sales taxes on the industry in India, researchers argue that such legislation is unlikely to have an egregious impact at the macro level.[50 51] Using input output models, most independent studies estimate a negligible impact on economic activity from eliminating or reducing expenditure on tobacco.[51]

Roy et al[52] examine this effect by measuring the perceived economic importance of the bidi industry in Bangladesh. The authors estimate that poor smokers on an average spend 4.5% of their daily income to purchase bidis. The total annual spending on bidis by the poor is large enough to be equivalent to about 41.6% of the total national expenditure on health. Due to the exploitative nature of the employment in bidi industry (also discussed in Rasheed and Sinha[53]), a majority of the money spent on bidis does not reach bidi workers, but rather goes to owners.

Given this evidence, higher bidi taxes in India are unlikely to result in economic fallout at the macroeconomic level. Nevertheless, concerns about the displacement of bidi workers at the micro level can be addressed through safeguards such as using a part of the additional tax revenue to assist bidi workers in making the transition to other productive livelihoods,

following international examples of such policies, for example, in Turkey.[54]

Thus, the main consideration is the minimisation of transition costs of bidi smoking. Already, evidence that manufactured cigarettes (which are more capital intensive) are displacing bidi consumption among younger Indians suggests that future employment in the bidi sector will be smaller.[55] Past reviews have demonstrated that efforts to 'buy out' (ie, providing direct economic transfer to stop production) tobacco growers do not work well.[50 51] As long as demand continues, another grower will replace the grower bought out. However, targeted schemes to provide job training, skill development, and better primary and secondary education would reduce the attractiveness of bidi production.

In evaluating societal tradeoffs of higher bidi taxes, we must consider not only jobs but also the quality of jobs and health impacts. The basic tradeoff is between 1 million smoking deaths, 70% of which occur during productive ages 30–69 years, and a few million bidi industry jobs that can be moved to other sectors. Raising taxes on bidis can raise billions of rupees in tax revenue and prevent millions of people from smoking.[4] Conservatively, each bidi job's economic output is about Rs. 7600 (US$143) annually, resulting in a total output of $713 million in our data. In comparison, the direct medical cost of treating all smoking-related diseases alone was estimated at $907 million in 2004, most of which was caused by bidi smoking.[8] The economic loss from premature deaths and poverty traps from about 1 million smoking deaths is certainly a much greater order of magnitude.

> ## What this paper adds
>
> ▶ Researchers have shown worldwide that taxes on tobacco products are the single most effective method of reducing tobacco consumption and the related health and economic burden. However, *bidis* (small handmade cigarettes), the most common form of smoking tobacco product sold in India, remain largely untaxed. One common argument against higher taxes on *bidis* is the potential loss of economic activity and employment in the *bidi* industry from reduced consumption. However, this argument is founded less on evidence and more on political dynamics of the industry.
>
> ▶ Our paper is the first to deconstruct this debate by estimating the economic contribution of the *bidi* industry in India. We find that the economic footprint of the industry is rather small when measured in terms of output, value added and employment. The employees in this industry are also severely underpaid. We argue that the positive gains from higher taxes and reduced *bidi* consumption, therefore, may well outweigh any temporary loss in economic activity. In addition, as with many declining industries, the displaced workforce could be rehabilitated in other industries, resulting is a net gain.

[xii]If bidi employment is studied as a share of the labour force, the contribution diminishes further. As per the Planning Commission, the unemployment rate in 2004–2005 was about 8.28%, which means that of the 499 million strong labour force, bidi only constituted 0.83%.

REFERENCES

1 Jha P, Jacob B, Gajalakshmi V, *et al*. A nationally representative case-control study of smoking and death in India. *N Engl J Med* 2008;358:1137–47.

2 IIPS. Global Adult Tobacco Survey India (GATS India), 2009–10, India. 2010. http://www.whoindia.org/en/Section20/Section25_1861.htm

3 John RM, Rao R, Rao M, *et al*. *The economics of tobacco and tobacco taxation in India*. Paris: International Union Against Tuberculosis and Lung Disease, 2010. http://global.tobaccofreekids.org/files/pdfs/en/India_Tobacco_Economics_full_en.pdf (accessed 5 Jul 2013).

4 Jha P, Guindon E, Joseph RA, *et al*. A rational taxation system of bidis and cigarettes to reduce smoking deaths in India. *Econ Polit Wkly* 2011; XLVI:44–51. http://www1.cghr.org/wordpress/wp-content/uploads/A-rational-taxation-system-of-bidis-and-cigarettes-to-reduce...India-2011.pdf (accessed 5 Jul 2013).

5 Lal PG, Wilson NC. The perverse economics of the Bidi and Tendu trade. *Econ Polit Wkly* 2012;XLVII:77–80. http://www.epw.in/discussion/perverse-economics-bidi-and-tendu-trade.html (accessed 5 Jul 2013).

6 Gupta P, Asma S. *Bidi smoking and public health*. New Delhi, India: Ministry of Health and Family Welfare, Government of India, 2008.

7 Reddy SK, Gupta PC. Report on Tobacco Control in India. 2004.

8 John RM, Sung H-Y, Max W. Economic cost of tobacco use in India, 2004. *Tob Control* 2009;18:138–43.

9 John RM, Sung H-Y, Max WB, *et al*. Counting 15 million more poor in India, thanks to tobacco. *Tob Control* 2011;20:349–52. http://www.ncbi.nlm.nih.gov/pubmed/21292807 (accessed 5 Jul 2013).

10 ILO. The beedi sector in India: an overview- improving working conditions and emloyment opportunities for women workers in beedi industry. Mangalore, Karnataka, India: International Labour Organization, 2001.

11 Mittal S, Mittal A, Rengappa R. Ocular manifestations in bidi industry workers: possible consequences of occupational exposure to tobacco dust. *Indian J Ophthalmol* 2008;56:319–22. http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2636170&tool=pmcentrez&rendertype=abstract (accessed 8 Jul 2013).

12 Sen V. Effects of working condition on health of beedi workers: a study of Sagar District of Madhya Pradesh. In: Ghosh A, ed. *Environment drinking water and public health: problems and future goals*. New Delhi, India: Daya Publishing House, 2007:132–49. http://www.amazon.com/Environment-Drinking-Water-Public-Health/d/8170354811 (accessed 8 Jul 2013).

13 Ranjitsingh A, Padmalatha C. Occupational illness of beedi rollers in South India. *Environ Econ* 1995;13:875–9.

14 Bagwe AN, Bhisey RA. Occupational exposure to unburnt bidi tobacco elevates mutagenic burden among tobacco processors. *Carcinogenesis* 1995;16:1095–9. http://carcin.oxfordjournals.org/content/16/5/1095.abstract (accessed 8 Jul 2013).

15 Swami S, Suryakar AN, Katkam RV, *et al*. Absorption of nicotine induces oxidative stress among bidi workers. *Indian J Public Health* 2006;50:231–5. http://www.ncbi.nlm.nih.gov/pubmed/17444052 (accessed 8 Jul 2013).

16 IARC. Effectiveness of Tax and Price Policies for Tobacco Control. In: J Daniel, Ed. *IARC Handbooks of Cancer Prevention in Tobacco Control, Volume 14*. Lyon, France: IARC Press, 2011:1–366.

17 Guindon GE, Nandi A, Chaloupka FJ, *et al*. Socioeconomic differences in the impact of smoking tobacco and alcohol prices on smoking in India. Cambridge, MA, 2011. http://www.nber.org/papers/w17580 (accessed 3 Feb 2012).

18 Sunley EM. India: The Tax Treatment of Bidis. Bloomberg Philanthropies. 2008.

19 Das S. *A better deal for beedi workers*. New Delhi, India: Labour Welfare Organization, Ministry of Labour, Government of India, 2000.

20 Rustagi P, Srivastave P, Bhardwaj P, *et al*. Survey of studies on beedi industry with special emphasis on women and child labour. New Delhi, India: Center for Women's Development Studies, 2001.

21 Srinivasulu K. Impact of liberalisation on beedi workers. *Econ Polit Wkly* 1997;32:515–17. http://www.epw.in/commentary/andhra-pradesh-impact-liberalisation-beedi-workers.html (accessed 8 Jul 2013).

22 Prasad KVE, Prasad A. *Bidi workers of Central India: a study of production process and working and living conditions*. New Delhi, India: National Labour Institute, 1985. http://vslopac.iimahd.ernet.in/cgi-bin/koha/opac-detail.pl?biblionumber=97534 (accessed 8 Jul 2013).

23 Rajakumar PA. Beedi industry in rural areas: an overview. In: Soundarapandian M, ed. *Small scale industries: problems of small-scale industries*. New Delhi, India: Concept Publishing Company, 2002:247. http://books.google.com/books?hl=en&lr=&id=TojZelczVxAC&pgis=1 (accessed 8 Jul 2013).

24 Rajasekhar D, Sreedhar G. Changing face of beedi industry: a study in Karnataka. *Econ Polit Wkly* 2002;37:4023–8. http://www.jstor.org/discover/10.2307/4412662?uid=2129&uid=2134&uid=2&uid=70&uid=4&sid=21102442669601

25 Ministry of Labour. Annual Report 2000–2001. New Delhi, India, 2001.

26 Avachat A. Bidi workers of Nipani. *Econ Polit Wkly* 1978;13:1176–8. http://www.jstor.org/discover/10.2307/4366828?uid=2129&uid=2&uid=70&uid=4&sid=21102442669601

27 GOI Ministry of Labour. Annual Report 1999–2000. New Delhi, India, 2000.

28 Aghi M, Gopal M. Exploiting women and children-India's beedi industry. *Lifeline* 2001;6:8–10.

29 Saravanan V. Women's employment and reduction of child labour: beedi workers in rural Tamil Nadu. *Econ Polit Wkly* 2002;XXXVII:5205–14. http://www.epw.in/review-labour/womens-employment-and-reduction-child-labour.html (accessed 8 Jul 2013).

30 Bagchi J, Mukhopadhyay A. *Child labour in beedi industry, Murshidabad District in West Bengal*. Calcutta: School of Women's Studies Jadavpur University, 1996. http://www.worldcat.org/title/child-labour-in-beedi-industry-murshidabad-district-in-west-bengal/oclc/37806505 (accessed 8 Jul 2013).

31 Gopal M. *Labour Process and its Impact on the Lives of Women Workers: A Study of the Beedi Industry in Keelapavoor Block of Tirunelveli District, Tamil Nadu*. 1997. http://scholar.google.com/scholar?cluster=7583281045774181128&hl=en&as_sdt=20005&sciodt=0,9#0 (accessed 8 Jul 2013).

32 Mohandas M. Beedi workers in Kerala conditions of life and work. *Econ Polit Wkly* 1980. http://www.epw.in/special-articles/beedi-workers-kerala-conditions-life-and-work.html (accessed 8 Jul 2013).

33 National Productivity Council of India. Productivity & competitiveness of Indian manufacturing sector: textiles and garments. New Delhi, India: Ministry of Commerce and Industry, Government of India, 2010.

34 NCEUS. Contribution of the Unorganised sector to GDP: Report of the Sub Committee of a NCEUS Task Force. New Delhi, India, 2008.

35 National Sample Survey Organization. Unorganised manufacturing sector in India: input, output and value added NSS 62nd round. New Delhi, India: National Sample Survey Organization, Ministry of Statistics and Programme Implementation, Government of India, 2007.

36 IMRB. Cigarette and Bidi Industry: A Comparative Status. India: Indian Market Research Bureau, 1996.

37 Krishnamurty J, Raveendran G. *Measures of labour force participation and utilization*. New Delhi, India, 2008.

38 Planning Commission. Employment across various sectors (in millions), Employment Elasticity, CAGR & Share of Employment and GVA: 1999–2000, 2004–2005, 2009–2010. Databook for Deputy Chairman, Planning Commission Government of India. 2013:84. http://planningcommission.nic.in/data/datatable/index.php?data=datatab (accessed 14 Aug 2013).

39 National Survey Sample Organization. Employment and Unemployment Situation in India 2005–2006.New Delhi, India: Ministry of Statistics and Programme Implementation, Government of India, 2008.

40 International Labour Organization. Employment trends in the tobacco sector: Challenges and prospects. Geneva, 2003.

41 Ministry of Textiles. Integrated Handlooms Development Scheme Guidelines. Office of the Development Commissioner for Handlooms, Ministry of Textiles, Government of India, New Delhi, India. http://handlooms.nic.in/hl_ihds.pdf (accessed 16 Apr 2014).

42 Government of West Bengal. West Bengal Beedi Workers' Welfare Scheme. 2012:1–8. http://wb.gov.in/WBLabour/Download?alf_path=WebContent/Directorates/LabourDir/schemes&alf_f_name=WB_Beedi_Workers__Welfare_Scheme.pdf (accessed 4 Mar 2014).

43 Institute of Regional Analysis. Problems of Women Bidi workers in Madhya Pradesh and Maharashtra: a case study of Sagar, Madhya Pradesh and Gondia tehsil, Maharashtra. Bhopal: Institute of Regional Analysis, 1988.

44 Express News Service. Handloom industry dying a slow death. *New Indian Express* 2013. http://www.newindianexpress.com/states/odisha/Handloom-industry-dying-a-slow-death/2013/05/14/article1589534.ece#.Uwe5Tl5kKS1 (accessed 24 Feb 2014).

45 Niranjana S, Vinayan S, Andhra FD. Report on Growth and Prospects of the Handloom Industry. 2001.

46 Hiran U. Crisis grips handloom industry. *The Hindu* 2011. http://www.thehindu.com/news/cities/Kochi/crisis-grips-handloom-industry/article2237882.ece (accessed 24 Feb 2014).

47 Apparao T, Rao P. Livelihood insecurity and coping strategies of handloom weavers: a comparative study. *Stud Tribes Tribals* 2012;10:65–72. http://www.krepublishers.com/02-Journals/T & T/T & T-10-0-000-12-Web/T & T-10-01-000-12-Abst-PDF/S-T&T-10-1-065-12-238-Apparao-T/S-T&T-10-1-065-12-238-Apparao-T-Tt.pdf (accessed 24 Feb 2014).

48 Krishnan M, Ray SG. In India, bidi industry's clout trumps health initiatives. *Cent Public Integr* 2011. http://www.publicintegrity.org/2011/09/08/5923/india-bidi-industrys-clout-trumps-health-initiatives (accessed 20 Aug 2013).

49 Rajasekhar D, Sreedhar G. Alternative employment opportunities for women beedi workers: a study in Dakshina Kannada District of Karnataka. *J Rural Dev* 2002;21:449–81.

50 Jha P, Chaloupka FJ. *Tobacco control in developing countries*. Oxford: Oxford University Press, 2000. http://tigger.uic.edu/~fjc/Presentations/Scans/FinalPDFs/tc_Itoxvi.pdf

51 Jacobs R, Gale FG, Capehart TC, *et al*. The supply-side effects of tobacco control policies. In: Jha P, Chaloupka FJ, eds. *Tobacco control in developing countries*. Oxford: Oxford University Press, 2000;309:341.

52 Roy A, Efroymson D, Jones L, *et al*. Gainfully employed? An inquiry into bidi-dependent livelihoods in Bangladesh. *Tob Control* 2012;21:313–17. http://tobaccocontrol.bmj.com/content/early/2011/07/20/tc.2011.043000 (accessed 8 Jul 2013).

53 Rasheed A A, Sinha S. Bidi in Bangladesh: Myths and Reality. Campaign for Tobacco-Free Kids, 2012.

54 Yürekli A, Önder Z, Elibol M, *et al*. The economics of tobacco and tobacco taxation in Turkey. Paris, 2010. http://www.tobaccofreecenter.org/files/pdfs/en/Turkey_Tobacco_Economics_Annex_en.pdf (accessed 8 Jul 2013).

55 Lal P, Wilson N, Gupta P. Attributable deaths from smoking in the last 100 years in India. *Curr Sci* 2012;103:1085–90. http://www.indiaenvironmentportal.org.in/files/file/deathsfrom smoking.pdf (accessed 13 Aug 2013).