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Agricultural and Food Sector in U.S. and E.U. under COVID-19: Market Prospects and Policy Implications

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ABSTRACT

The COVID-19 pandemic shakes nearly all industries and sectors across the globe. The very reason that the agricultural and food sector is recognized as the essential business also make it comparatively vulnerable to the strike of the pandemic that requires limited movement regulation and stringent social distancing measure to contain the spread of virus. This paper attempts to provide a bird's-eye view of the trends and evolution in the agriculture and food market as well as the impacted stakeholders along the supply chain under the pandemic in the United States and the European Union. Focus industries include dairy, meat, fruits, vegetables, and wine. We present various policy responses and implementations across these two continents on the same page in this article, parallel with the fluctuations in the marketplace, which aim to help correct or adjust both the short-run and structural issues facing producers, distributors, retailers, and consumers. Retrieved from publicly available datasets, trends of price and imports for fruit and vegetable markets in United States are summarized while wine price patterns are sorted for selected EU member countries. We find that most policies or programs are not crop-specific but rather focus on certain industry, use holistic approach to enhance whole-farm wellbeing, and add flexibility to existing programs to ease the economic pressure facing producers and food businesses. We expect to bring in further discussions and reflections on the market dynamics and shed light on both developed and under-developed effective strategies used to revive and sustain the agri-food sector.

Keyword: COVID-19, agricultural production, supply chain, meat, produce, wine, policy response

INTRODUCTION

The COVID-19 pandemic has drastically changed the way the society and economy function. And the Corona virus does not spare any nation and industry, even the highly developed countries with predictably the most resources and capital to tackle this urgent issue. In essence, the COVID-19 pandemic differs from financial crisis in 2008-09 and Great Depression back in the 1930s. The nearly unstoppable spread of SARS-CoV-2 and the consequent lockdown order on large swath of areas hit almost every aspect of lives and business operations, imposing challenges on food service and processing sector that require face-to-face contact. This article focuses on the impacts of COVID-19 on the agricultural and food sector in the United States and European Union, where its well-developed service sector grounds to a halt that further influences the upstream agricultural production and downstream food provision and availability. The objective of this paper is to provide a brief and concise overview of the current trends of various agricultural and food sector in the United States and European Union. We bring in some interesting and valuable insights from a descriptive analysis and visual presentation of data

from the publicly available resources. The consequences of various policies or programs are still evolving as the COVID-19 development is currently under change in many facets and some of these numbers and trends might imply or serve as a warning or promising sign toward future response and precautionary strategies, either at the individual, community, local institutions, or national level.

Facing the ongoing and imminent living threats posed by the virus, various interventions such as social-distancing practices, facial mask wearing, shelter-in-place or lockdown, suspension of all non-essential businesses and social activities, and international travel bans are used by governments and public sectors as their best attempt to relieve the stress on the health care systems as well as mitigating the associated significant economic and societal losses. Here we briefly categorize the chain effects of COVID-19 on food and agriculture into two likely channels: The strict top-down regulations and orders to flatten the curve hit the food retail and service sector and consumers first. Then it ripples out to the relevant agricultural production environment. Second, the labor supply shortage and working environment inducing high transmission risks facing agricultural producers also weigh in at the beginning, resulting in the disruption in food supply and the availability for consumers at the later stage. Impacted dimension across production, processing, and retail includes issues and public discourse in food security and safety, food distribution and logistics, changes in consumer behavior, as well as food loss and waste.

The sharply dropped air and sea cargo that arose after January in 2020 posed unpredictable challenges on the food supply chain (OECD, 2020). Delays in handling and transporting brought additional layer of logistics concerns to ensure the safety of food and agricultural products where sanitary and phytosanitary standards are required. Intention of several Central Asia and Southeast Asia countries to enforce export restrictions of key commodities including rice raised fear and influenced the expectation among the international markets. The global staple crop markets remained relatively stable and optimistic while the perishable produce was more vulnerable to such trade flow restrictions (AMIS, 2020). Likely disruptions to labor and input supply such as seeds and fertilizers could have significant impacts on the crop production and farm management well into the next year, therefore increasing the uncertainty in the sufficiency of food availability.

Two specialized supply chains constitute the downstream of the food industry: One serves households. Another reaches the food-service industry. When the shelter-in-place order made restaurants close business and most people begin to work from home, both the food and agricultural system experienced unprecedented disruptions. The collapse in demand from institutions including restaurants, schools, hospitals, and hotels shocks the produce and dairy supply. The supply chains in these two dimensions are also very much specialized that it's challenging to convert the tremendous losses from food service industry into the potential gains which might possibly be fully absorbed by the grocery store chain, which would also help sustain the production capacity without being forced to dump the excess supply (Norwood and Peel, 2020).

This paper is structured by examining the impacts through several layer of lens on key commodities or crops and the stakeholders along the value chain. Agricultural production includes crops, livestock, and fishery as well as the impacts on labor market. Food industry dimension will take a closer look at the evolution of the marketplace under the pandemic. Combining the production and value chain perspectives towards the current situation of agricultural and food markets in U.S. and Europe, we also hope to highlight potential development in the future and implications for broader geographical regions in the world.

OBSERVATIONS AND POLICY RESPONSES IN THE U.S.

Treating April in 2020 as the cut-off period to look at the pattern of labor disruption, from February to April, the unemployment rate in food services and processing sector increased nearly 30% and 4.4% respectively. While after May 2020, all the food services, food processing, and food production sector rebounded with decrease in unemployment rate at 13.5%, 4.4%, and 0.9% respectively (Peña-Lévano *et al*., 2020). Shipments of fresh produce for food services could be reduced up to the level of 50%. Panic shopping due to the fear of shortage led to grocery spending rising for more than 50% (Peña-Lévano *et al*., 2020). Such emotion-driven purchasing behavior also led to the unavailability of some food items for consumers in their regular shopping: 13% say they "often" found that foods are out-of-stock while 44% say they "sometimes" (Norwood and Peel, 2020).

In terms of value for all purchases across different outlets, more of overall food expenditures went to grocery stores and other similar outlets which makes up the bulk share of food-at-home spending, compared to that goes to restaurants, drinking places, and schools. The difference was approximately between US$15~17 billion dollars in March and April in 2020, as shown in Figure 1 (USDA, 2020b). The long-lasting impact on the consumer side could be the shift in their preference and purchase willingness further toward safety and local food attributes (Melo, 2020).

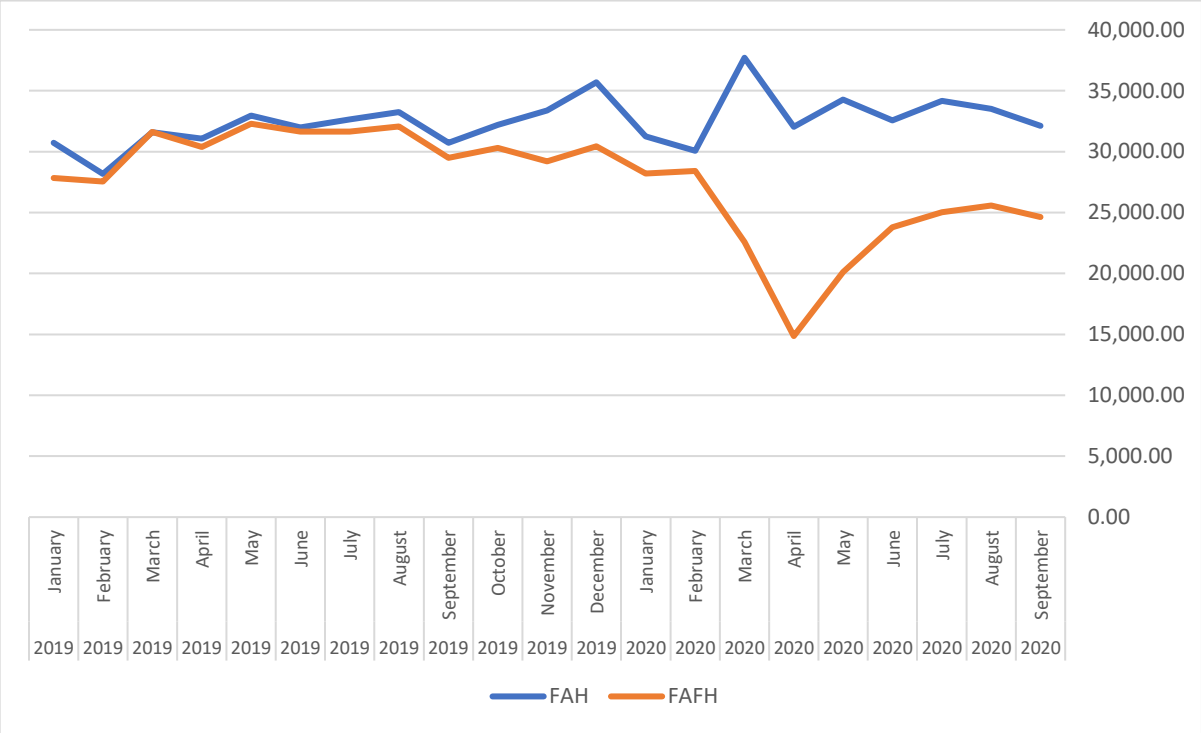

Figure 1. U.S. household expenditures on Food-At-Home and Food-Away-From-Home
Source: Food Expenditure Series (USDA, 2020b).

This article takes deeper look into certain crop and food markets while those that are not covered here are still worthwhile for further examination. Table 1 shows the price and shipment movement of aggregated fruit and vegetable crops. In vegetable markets, for selected weeks from April to November 2020, the total shipments including domestic and imports increased between 15 and 25% in July and August while around 3.5% since September compared to the same week in the previous year. The price declined between 3 and 8% since April and reached the greatest difference at 8.2% compared to the previous-year level. In fruit markets, the change in total shipment showed a negative direction compared to the level previous year but the gap reduced from April to August. At the peak of pandemic, the fruit price increased by more than 50% at the end of April compared to the same period on the previous year while it decreased by more than 10% in the beginning of June and July. The drop in retail prices for fruits and vegetables, observed for a period after the nationwide lockdown, might be due to the drop in demand from food service industry which constitute an important share of total market and the surge in household demand may not be sufficient to compensate the losses (National Geographic, 2020). One recent empirical study estimated the impact of COVID-19 on fruit and vegetable production due to the pandemic-induced disruption in the labor market. Major crop losses were taking place in main production states such as California, Arizona, Washington, and Florida and the crop-specific losses ranged from US$5 million for apples to US$16 million for lettuce (Ridley and Devadoss, 2020). It implies that the labor shortage contributed to particularly labor-intensive crop production and had left significant financial losses to high market-value crop producers, for whom the harvest season overlaps with the outbreak period. Another disadvantage for growers is that crop insurance program does not indemnify the crop losses caused by non-weather factors, so the program like Coronavirus Food Assistance Program (CFAP) provided by United States Department of Agriculture (USDA) for producers of agricultural commodities who faced market disruptions due to COVID-19 would step in more timely to help relieve their economic and financial losses.

For the livestock and meat sector, the broiler industry was less affected by the COVID-19 compared to pork and beef. The daily processing capacity for beef and pork was 40% lower than the prior year level at the end of April 2020 (Lusk *et al.*, 2020). However, there is one key policy difference facing different livestock and meat industry: Producers of cattle and hogs receive direct payments based on actual losses while poultry producers do not receive such relief since they don't own the birds themselves and do not have full control of the bird management system (Maple *et al.*, 2020).

Table 1. Selected weekly fruit and vegetable movement and retail price in the United States, April-November, 2020

	Market volume, selected week											
	Domestic				Imports				Total shipments			
					Change from previous:							
	Week		Year		Week		Year		Week		Year	
	Vegetable	Fruit	Vegetable	Fruit	Vegetable	Fruit	Vegetable	Fruit	Vegetable	Fruit	Vegetable	Fruit
Week						*percent*						
4/26-5/2	2.2	3.6	0.0	-37.8	-2.9	3.4	14.8	-12.5	0.9	3.5	3.1	-23.7
5/31-6/6	2.8	13.6	-5.3	-27.3	-8.8	-0.2	19.7	-4.8	0.4	6.4	-1.4	-17.8
6/28-7/4	-9.3	-6.7	4.3	-2.9	-22.1	-32.2	30.1	-17.3	-11.7	-17.1	7.8	-8.2
7/26-8/1	-6.9	-7.7	21.4	0.4	-1.9	-1.9	34.2	-21.7	-6.1	-5.7	23.4	-8.8
8/30-9/5	4.8	-3.8	13.8	13.7	0.4	-34.9	32.7	-26.2	4.1	-18.8	16.3	-5.9
9/27-10/3	-0.5		-0.2		-0.4		22.7		-0.4		3.6	
11/1-11/7	3.3		-1.1		6.4		22.1		4.0		3.4	

	Advertised retail prices					
	Selected week price		Change from previous:			
			Week		Year	
	Vegetable	Fruit	Vegetable	Fruit	Vegetable	Fruit
Week	*US$/pound*			*percent*		
4/26-5/2	1.53	0.70	7.2	-3.5	-5.0	54.3
5/31-6/6	1.52	0.44	2.2	-20.9	-3.7	-19.4
6/28-7/4	1.46	0.47	-3.8	-16.3	-6.9	-10.7
7/26-8/1	1.61	1.10	5.7	-1.9	-3.0	17.5
8/30-9/5	1.51	1.06	5.5	16.6	-8.2	-2.4
9/27-10/3	1.47		-0.8		-1.4	
11/1-11/7	1.41		-5.5		-6.1	

Source: Selected weekly fruits and vegetables movement and price (USDA 2020c, 2020d)

The wine market experienced a surge in demand at the off-premise stores and direct-to-consumer channels during the pandemic times (McDonald, 2020). To begin with the price evolution, the average price per 750 ML at direct-to-consumer shipment was lower throughout 2020 compared to the previous-year level: In October, the price was at US$45.67, around US$5 lower than the level of the previous October. The decline in retail prices was caused by the much smaller increase in shipment value than the increase in volume (9L cases). In April, the shipment value was 18% higher and the volume was 45% higher compared to its counterpart in the previous year. The story is different in the price evolution in the retail off-premise channel. The price was higher this year and the gap in price between 2020 and the previous year became larger as the season moves into the winter. At the end of October, the off-premise price was US$11.33, greater than the previous year price by less than US$1. The value and volume at retail off-premise channel reached its peak in May 2020, one month later compared to that observed within the direct-to-consumer channel, along with the 34% and 29% greater in the magnitude than the performance previous year.

USDA provides two platforms for all the stakeholders along the food supply chain including consumers to tackle consequent food and agricultural sectoral problems during the pandemic. One designates FAQ sections for the timely policy responses to several key aspects including Farmer Resources, Food Assistance, Loans, School Meals, Food Supply Chain, Animals and Plants, and National Forests. Another one sketches out more focused themes, particularly the Farmer Resources, on current USDA flexibilities and programs including Coronavirus Food Assistance Program (CFAP), Dumped milk, Crop insurance flexibilities, Farm loan and Commodity loan flexibilities, Crop acreage reporting, Animal mortality, as well as Small Business Administration Programs for Farmers (USDA, 2020a). Here we present the takeaway messages for selected programs in both platforms.

Included in the CFPA in Phase I, USDA had planned to procure an estimated US$3 billion in fresh fruits and vegetables, dairy, and meat products to distribute to food pantries and food banks to ensure the sufficient food available for disadvantaged communities. Several food and nutritional programs have been implemented underway to guarantee the secure and healthy status for American families (FNS, 2020): States provide free meals for children, Supplement Nutrition Assistance Program (SNAP) benefits increase along with expanded access to buy online, and state and local agencies provide food directly to households under disaster household distribution program. Coronavirus Food Assistance Program was renewed in September into its second phase (CFAP 2) with additional US$14 billion dollars to assist producers to overcome the associated adjustment and marketing costs resulting from the market disruptions such as abrupt reduction in demand and short-run oversupply. CFAP 2 supports row crops, livestock, specialty crops, dairy, and aquaculture, which are then categorized into three broader groups receiving payments based on different criteria through Farm Service Agency (FSA).

Price trigger commodities are major commodities that met a minimum 5% price decline over the specified period, including barley, corn, sorghum, soybeans, sunflowers, upland cotton, wheat, broilers, eggs, milk, and livestock. For commodities, the payment is based on the 2020 planted acres multiplied by either US$15/acre or by the adjustment of crop-specific rate and approved yield from the individual- or county-level production history. For broilers and eggs, payments are based on 75% of previous year production. Payments for dairy and livestock are based on actual production and maximum own inventory between April and August 2020, respectively. Flat-rate crops are those which do not encounter such trigger-level price decline or do not have available data. Including alfalfa, extra-long staple cotton, oats, peanuts, rice, hemp, millet, mustard, safflower, sesame, triticale, rapeseed, this category receives payments based on 2020 acres and rate at US$15/acre. The third category, Sales Commodities, includes specialty crops, aquaculture, nursery crops, floriculture, and other commodities not included in the first two categories. Payment calculation uses a sales-based approach, associated with 2019 sales.

For crop insurance program, several flexibilities are provided in response to the COVID-19, including allowing the electronic submission of reports and notifications, production date extension, extended time for premium payment and acreage reports, and allowing alternative transaction format for 2021 crop year sales. Risk Management Agency also works closely with approved insurance provider (API) to introduce more flexibilities for certain crop industry such as dairy, nursery, perennial crop, and organic acreage report. Specifically on the dumpling issue due to limited demand, the insurance scheme for milk handlers or cooperatives including Dairy Revenue Protection and Livestock Gross Margin for Dairy program provided by Risk Management Agency allows the Approved Insurance Providers (AIP) to count dumped milk toward indemnifiable losses. Farmers will not be inappropriately penalized by the dumping behavior; the insurance indemnity and payment schedule will not be affected by this type of non-natural disaster leading to production losses.

Regarding loan flexibility programs, USDA's Farm Service Agency is providing farmers more credit options to sustain, particularly in tough times, annual operating and living expenses, term investments, emergency needs, and stable cash flow. Deadlines are extended for producers who have to respond to application for direct loans. Foreclosure or eviction is temporarily suspended. More flexibility in servicing guaranteed loans now allow Standard Eligible Lenders and Certified Lender Program to certify that they have met the requirement for emergency advances and FSA written approval is no longer needed.

In addition, besides CFAP and the flexibility allowance in the crop insurance and commodity loan program, direct assistance also includes the livestock, forestry, and fishery industry as well as specialty crop and organic producers. Pandemic livestock Indemnity program provides financial assistance to producers of eligible livestock and poultry herds depopulated due to the insufficient processing operation and limited markets resulting from the pandemic. In addition to the unvoluntary animal losses, the USDA also plans to provide support to the hog producers since the drop in hog prices from the five-year average was significant during the six months after the nation-wide lockdown. To address the issue of the excess herd population, the Natural Resources Conservation Service under USDA helps producers to properly dispose of the livestock and help cover part of the costs through the Environmental Quality Incentives Program and the Emergency Animal Mortality Management practice. At the same time, timber harvest and hauling business also face sharp revenue losses compared to the previous year. USDA announced the Pandemic Assistance for Timber Harvesters and Haulers Program for individual loggers and truckers with financial assistance of US$125,000 per person or per legal entity. For dairy industry, USDA allocated US$400 million to redistribute the milk to nonprofit organizations and those in need to minimize the food waste through Dairy Donation Program. For specialty crop growers, there are two aspects of the support: One is on the labor and another is on research and development. Farmworkers in this industry receive assistance for Personal Protective Equipment (PPE) and vaccination costs. Innovative projects will be funded toward farmers, food business, and any relevant entities to expand the existing specialty crop sector and explore new opportunities in response to the supply chain disruptions or temporary shutdown. For organic producers, including those who

are in the transition period, additional cost share assistance during the pandemic will be provided to continue the support for organic industry which might face more marketing challenges and risks. Besides specialty and organic sector, under the Pandemic Responses and Safety Grants, like specialty crop producers, meat packers and processors and the seafood industry workers will also receive assistance on the PPE and necessary protective measures. Throughout the whole agricultural industry, under the Value-added Producer Grant Program, producers are encouraged and financially supported to enter into value-added activities along the supply chain to develop and market new products, given the rapid change in demand as well as the food service industry during the COVID-19 pandemic.

OBSERVATIONS AND POLICY RESPONSES IN E.U.

In Europe, the supply side of the agricultural market stays comparatively resilient despite the drastic drop in the retailing and food service sector. However, risk remains. Restrictions on the mobility of the seasonal workers dampen the prospects of good harvest for horticultural crops and the processing capacity in the packing facilities for the meat products. Cramped working and living environment and condition for seasonal and migrant workers pose challenges as the tasks required for their jobs would be the least possible to fully enforce social-distancing and good hygiene practices. We use the European Commission Agri-Food Data Portal for the following analysis across various sectors (European Commission, 2020).

In the dairy sector, raw milk price in EU at the beginning of 2020 was as strong as the level in 2019, at about €35 (US$41[1]) per 100kg. All the main production countries, Germany, France, Italy, Netherlands, and Poland, including EU as a whole experienced the drop in milk prices starting in February while the price began to climb back around May. One reason for the decreasing price in March is due to the usual seasonal production peak in April. The private storage aid policy and the drought in some part of Europe helped relieve the supply pressure to certain extent (New Zealand Foreign Affairs & Trade, 2020). This observation is based on the fact that the earlier production peak in the spring depresses the price and increases the risk of oversupply facing by dairy producers. The private storage aid scheme is to allow the temporary withdrawal of dairy products, including skimmed milk powder, butter, and cheese, from the market for a minimum of 2 to 3 months and a maximum period of 5 to 6 months, which will reduce the available milk supply on the market and rebalance the market on the long-term (European Commission, 2020). At the same time, the drought, as happened in earlier years, could add pressure for dairy producers with feed shortage, higher feed costs, and reduced herd, therefore reducing overall production (European Milk Board, 2018).

In the cattle and beef market, there had been issues for beef slaughterhouses in Ireland and Germany, accompanied by the infectious clusters leading to the closure or slow-down of processing activities and associated with poor working and living environment (New Zealand Foreign Affairs & Trade, 2020). The price for carcasses went down between 0.6 and 5.5% compared to the level of the previous year. The price for young bovine, young bulls, and steers dropped to the level of €356 (US$414) per 100kg. The pig market in EU remained resilient in terms of price stability compared to the market in Brazil, U.S., and Canada, although the pig price decreased gradually from nearly €190 (US$221) per 100kg at the end of February to €140 (US$163) in October. At the same time, the price in other regions of the world started to climb back. The EU poultry market actually experienced a more promising market trend in the first quarter of 2020 compared to the level over the past 5 years. However, the broiler price reached nearly the bottom level at €175 (US$204) per 100kg in May and June. Both chicken and pork price dropped to a record low level in May, compared to their upward trends in the price dynamic during the same period of the previous year. In sheep market, a steep drop in price was observed for the light lamb both due to COVID-19 and the uncertainty resulting from Brexit while the lamb price remained unaffected and high under these two external factors' influences. Both prices were recovering as the restrictions on the food service sector were gradually lifted.

In fruit and vegetable markets, apples, citrus fruits, and tomatoes were the key focuses in this paper using the available data in the Agri-food portal. Compared to the 5-year average, the apple market in July-August 2020 experienced decrease in price in all major producing countries including EU except for France, where the price increased from €96 (US$112) to €108 (US$126) per 100kg. The citrus market in June experienced a stable upward trend in price movement compared to the 5-year average. The tomato and potato markets both experienced a decline in price starting this February and March while the potato price movement in downward pattern came as

[1] The EURO is also converted to US Dollars, based on the currency rate on 10/22/2021. Access at: https://www.federalreserve.gov/releases/h10/current/default.htm

early as in late January. And the potato market was closely interconnected with the near evaporation of demand within the food service industry, e.g., French fries in fast food restaurant.

Compared to other industries, there seems to have been a resilience in the wine market. Figures 2 and 3 show the bulk wine prices in 2019/2020 in two of the largest wine producing countries in Europe. In Germany, white wine usually goes with higher prices compared to red wine and rose. The price was stagnant starting January 2020, and then prices began to decline in May, which was perhaps due to the return-to-normal demand in both on- and off-premise retail chains. In France, wine price with AOP and IGP are higher and red wine is usually more expensive than the white wine. AOP is Appellation d'Origine Protégée (AOP), which is France's highest and most rigid system for wine classification and regulates nearly the whole production system. Only specific set of grapes are legally allowed to be used to make wine. IGP is Vin de Pays, which is known as a classification for French wine commonly seen in daily life. Such designation is less restricted with more variety of grapes allowed to be used. The price remained flat starting January 2020, accompanied by two anomalies: The price for premium red wine with AOP continued to decrease in the beginning of 2020. The general term including both AOP and IGP, among other appellation systems, are known as *Geographic Indicator*, GI. The price for white wine without GI but with the grape name jumped to the level as high as the premium red wine with AOP, which may be reflecting the change in consumer preferences during the lockdown order that drives up the price.

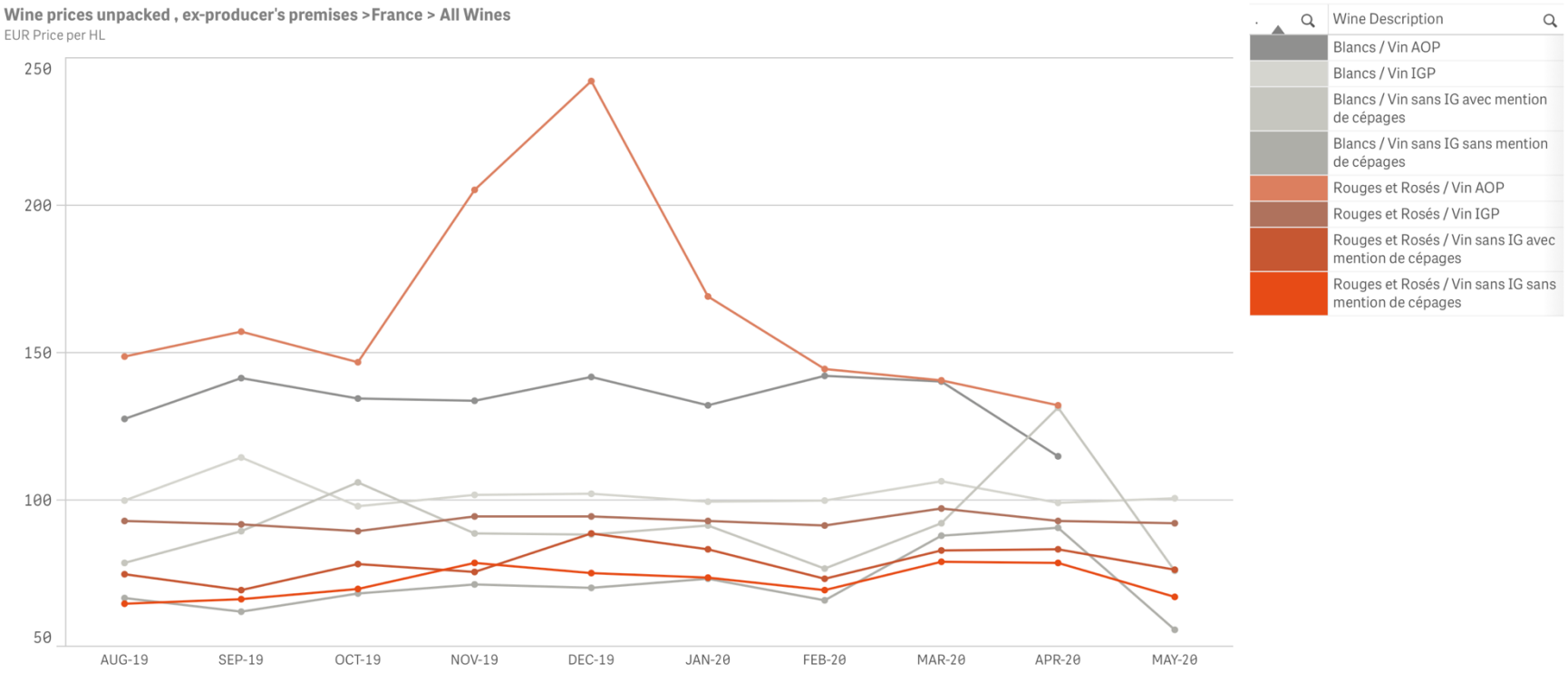

Figure 2. Wine prices unpacked, ex-producer's premises, France

Source: European Commission, Agri-Wine price, 2020. Accessed at: https://agridata.ec.europa.eu/extensions/DashboardWine/WinePrice.html

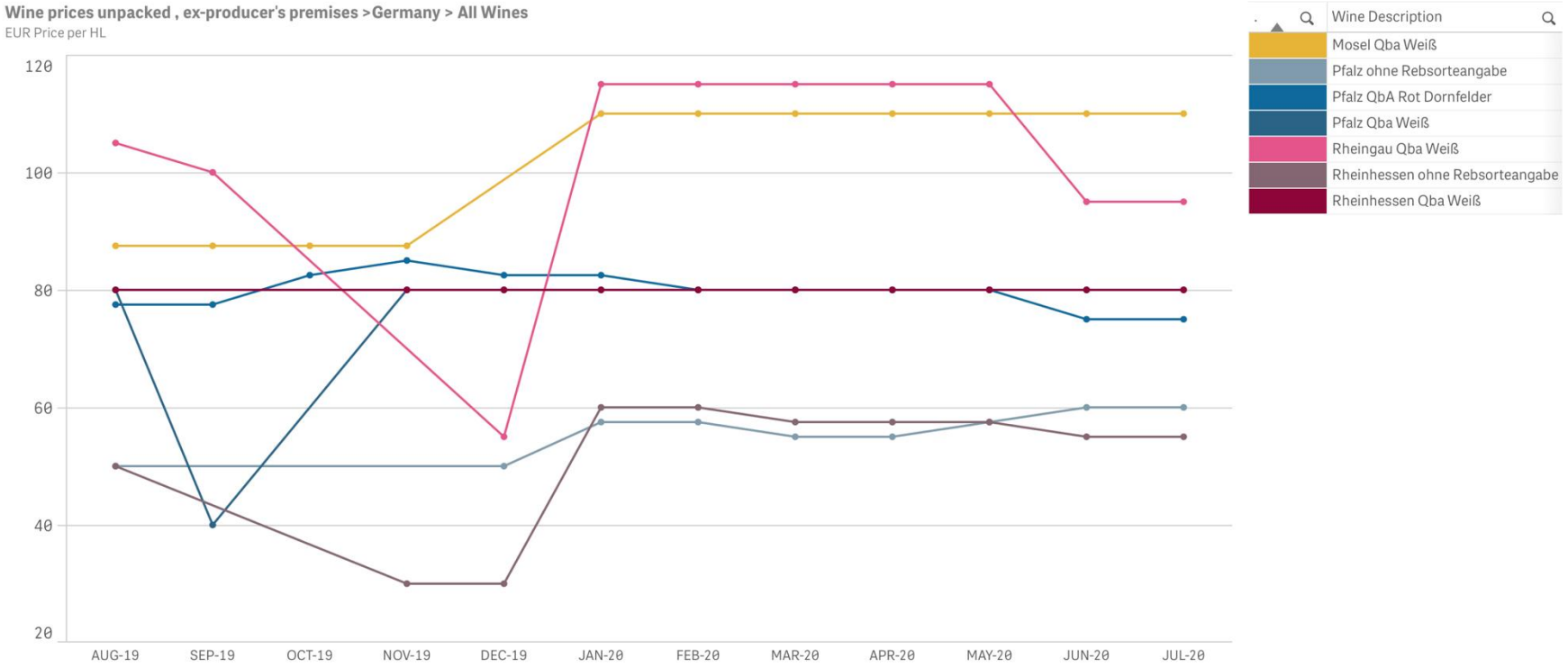

Figure 3. Wine prices unpacked, ex-producer's premises, Germany

Source: European Commission, Agri-Wine price, 2020. Accessed at: https://agridata.ec.europa.eu/extensions/DashboardWine/WinePrice.

The European Union supports its agricultural and fisheries sector by providing higher advances of payments, allowing flexibility in fund use, establishing 'green lanes' program, and raising awareness for seasonal workers (European Commission, 2020b). Some EU policies in alleviating the negative impacts from pandemic target certain crop or livestock industry while others focus on different stakeholders along the supply chain. For fishers and aquaculture producers, support measures include compensation for temporary suspension of fishing activities, temporary cessation or reduction of aquaculture production and marketing services, and economic losses incurred from offshore fishing activities in the outmost regions by the Member States.

Crisis management measures encompass flexibilities and deregulatory rules on certain crops and products. Dairy (skimmed milk powder, butter, cheese) and meat (beef, sheep and goat meat) products, as well as fishery products, are allowed for private storage to restrain the foreseeable oversupply and to withhold the production. The Commission will provide the aid to deal with the withdrawal of such perishable animal products from the market for a maximum of up to 6 months. Derogation from organizational regulation on market competition for potato, milk, and flower sector is authorized. Operators can choose to collectively plan for the overall production or to drop their current production without legal considerations. Commission also implements market support programs that limit the availability and reorient funding priorities for wine, fruits and vegetables, olive products, apiculture, as well as the EU school meal scheme.

Financial instrument such as loans or guarantees for operating expenses of up to €200,000 (US$232,640) is available for farmers and rural development beneficiaries. The new state aid under Commission's temporary framework provides a maximum of €120,000 (US$139,584) per farm and of €800,000 (US$930,560) per food processing and marketing company. Advances of direct payments and rural development payments are raised to increase the cash flow for farmers at the level between 70 and 85%. Any remaining financial aids under rural development funds could be channeled towards farmers and small and medium-sized enterprises for emergency assistance by the Member States, up to €7,000 and €50,000 (US$8,142 and US$58,160) for these two groups respectively.

In spite of travel restriction, transportation of goods across borders among EU countries is now facilitated by the "Green Lanes" program to ensure the sufficient supply of the agri-food products. Border crossing is expected take no more than 15 minutes at the check points. Seasonal workers are now qualified as "critical" workers who are recognized as indispensable for the agricultural sector, particularly at the harvest season.

CONCLUSION

This article focuses on current market trends and policy responses in the United States and European Union. We provide a brief overview of selected crop, livestock, and food markets across these two continents. The vulnerable market hit around early spring 2020 starts to climb back to its normal point into summer and later fall and perhaps the upcoming holiday season around the end of year. Policy recommendations and implementations by the public sector are presented parallel with the observations on the ongoing development and changes in the marketplace. Convergence on the support measures adopted in the U.S. and E.U. was on granting the flexibilities and expediting the lengthy administrative process for various types of application on current market and risk management programs for agricultural, ranching, and fishing sector. Dairy and meat industry received more attention and production adjustment supports due to its supply chain challenges. Migrant and seasonal farm worker availability remained to be one of the bottlenecks that block a well-functioning agricultural supply chain, particularly for the horticultural crop and meat industry.

The common thread across these various issues in and outside the U.S. and E.U. was that fixing the demand shock will help restore the supply chain. Both the public and private sector can and should work together to sort out alternatives to minimize the losses incurred from the significant change in the food service landscape and to facilitate the coordination between different marketing channels. Timely response, logistic efficiency, a sound economy, as well as identifying certain vulnerable aspects rooted in some of the agricultural and food industries would contribute to building a more resilient agri-food industry in the future, which serves as a critical buffer for the whole society facing another crisis or disaster at the global scale across national borders in the long run. While during the pandemic and into the post-pandemic times, it would be worthwhile to investigate the potential irreversible and permanent changes taking place in the agriculture and food markets. Developed habits for online grocery shopping when sheltering in place, the mature food delivery service, adjustment of e-commerce platform to accommodate the surge in demand during the lockdown, and demand for safety and local attributes might all continue as a "new normal" and sustain the future of daily life across the United States, European Union, and also the Asian countries.

Last but not the least, the ASEAN is the most rapidly growing economy as a whole and is a significant supplier of agricultural commodities, which entails the high heterogeneity and diversity of its member countries. If policies in the United States and the European Union may have some implications for the ASEAN region, response strategies may include facilitating the movement of labor across regions to stabilize crop production and sustain food security, like the green lane program in the EU. The program is implemented in a way that protects seasonal agricultural workers within the border under stringent working environment that was imposed by the COVID-19 pandemic. The farm loan program supported by the government, including flexibilities in disaster payments and particularly for small-scale farms or food enterprises, could also provide timely buffer for farmers under financial stress due to shrinking market demand, stagnant marketing channel operations, and potential higher input prices given limited trade conditions under the pandemic. For international trade arrangement, the ASEAN plays indispensable roles in supplying raw materials and grains, in which the lockdown policy to contain the virus within and beyond the borders might also impede the ASEAN's contribution to the global food distribution and the economic benefits from exports and cooperative partnerships. Therefore, it seems that the overall domestic or inter-region directives to boost the economy and reduce the confirmed cases might be one of the priorities needed to envision and secure a sustainable agricultural and food sector in the ASEAN region in the long run.

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